Contractor Report 94-63

Considerations for Optimal Siting of Receiving Arrays off Canada's West Coast for ATOC (Acoustic Thermometry of Ocean Climate)

Prepared by

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CONSIDERATIONS FOR OPTIMAL SITING OF RECEIVING ARRAYS OFF CANADA'S WEST COAST FOR ATOC (ACOUSTICAL THERMOMETRY OF OCEAN CLIMATE).

Introduction

This report is one of a series written to describe the work carried out under Contract No. W7708-2-0518/01-XSA - An Acoustic Ocean Thermometer for detection of Global Warming. It is essentially concerned with a study of the implications of Canada installing a receiving array off its west coast to monitor transmissions from the acoustic transmitter to be mounted near the island of Kauai, Hawaii, for the ATOC (Acoustic Thermometry of Ocean Climate) programme. The study examines the bathymetry of the N. Pacific Ocean in the path from the Island of Kauai to the west coast of Vancouver Island. The NOAA ETOP5 dataset was used to provide depth information and four examples of bathymetric sections were produced for great circle tracks between Kauai and the vicinity of Coast Guard light stations at Langara, Cape St. James, Cape Scott and Ucluelet. Consideration is given to bringing data ashore using an underwater cable from a possible receiving array sited off the Canadian west coast and also the fish boat areal distributions were obtained with a view to estimating possible noise interference with a receiving array.

Before an optimum site is specified, in the event that a decision were made to use a cable to carry data ashore, experience shows, [1] that it would be necessary to carry out a small scale bathymetric survey in the vicinity of the light station chosen to act as a base station. A second limitation to the study is the lack of propagation characteristics between a sound transmitter located near the Island of Kauai and the west coast of Canada. This should form the basis of a separate study.

The study reported on here, examines,

(i) ocean bathymetric sections between the Hawaii transmitter site and arbitrary locations off the Canadian west coast, viz. in the vicinity of the light stations at Langara, Cape St. James, Cape Scott and Ucluelet on the Queen Charlotte and Vancouver Islands, where an acoustic receiving array might be sited;

(ii) the logistics of bringing data ashore to the light stations at Cape Scott, Quatsino, Nootka, Estevan Pt., Lennard Island, Amphetrite Point, Cape Beal, Pachena Point and Carmana Pt., from possible receiving arrays sited offshore and thence to the laboratory at DREP, and

(iii) the shipping densities and distributions in the general area where a receiving array might be placed.

Bathymetric Sections

The ATOC programme calls for the installation of a low frequency source (~70 Hz) in the Deep Sound Channel near the Island of Kauai, Hawaii and receivers to be installed at distant listening stations throughout the Pacific Basin. Initially, one receiver will likely be installed off Point Sur, California, and possibly another off the west coast of Canada at a site yet to be chosen.

If the installation of a Canadian receiver goes ahead it will be necessary to examine the nature of the sound propagation between Kauai and the Canadian west coast and this will require a capability to measure ocean bathymetric sections across ocean basins.[#]

In order to produce bathymetric sections along arbitrarily chosen great circle paths, bathymetric data for the NE Pacific Ocean (in the form of depths at intervals of 5 minutes of arc) were entered into a file of a 386 computer. An example of the output of

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[#] A proposal to carry out a study of sound propagation between Kauai and the west coast of Canada was submitted to the ATOC project office at Scripps Institution of Oceanography. The proposal has not been accepted to this time.

this data is shown in Figure 1, Pacific Ocean Bathymetry, and Figure 2, N.E. Pacific Ocean Bathymetry, which are contoured and coloured to show the depth distribution in the general area of interest. Bathymetric sections between the source position near the Island of Kauai and arbitrary points along the Canadian western seaboard in the vicinity of Canadian Coast Guard light stations at Langara, Cape St. James, Cape Scott and Ucluelet (or to any arbitrary point on the earth's surface if required) are calculated by reading depths from the bathymetric database which are within a limiting distance from a chosen Great Circle. Examples of bathymetric sections so produced are shown in Figure 3. The software developed has general application so that bathymetric profiles may readily be drawn along any Great Circle between the proposed position of the source and arbitrarily chosen landfalls on the Canadian coast.

The current concept for a Canadian receiving station for ATOC is either an autonomous single hydrophone or vertical array placed near the Deep Sound Channel depth or an array connected by cable to shore. If the array is connected to a shore station, the landfall of the shore cable will need to be as sheltered as possible so as to minimize the wear on the cable due to abrasion by sea waves. There will also be a requirement for a secure building in which to house any recording or telemetering equipment for storing data or effecting onward transmission to DREP. Since the bulk of the Western Canadian Seaboard is largely uninhabited, the most convenient sites for bringing data ashore are probably the Coast Guard light stations run by the Canadian Government. The locations of such stations are shown in Figure 4.

Choice of any one of the light station sites will depend on factors such as the oceanography along the associated great circle path from the transmitter to the receiver (*e.g.* does the great circle path intersect any oceanographic fronts), the length of the cable run from the receiving array to the light station, the shipping densities in the vicinity of the receiving array, the facilities available at the light station and the shelter from the sea for the cable afforded by the local sea side terrain.

Appendix I contains short descriptions of each of the light stations shown in Figure 4, with the exception of Cape St. James and Langara Island which, a priori, are considered too remote for effective servicing of a receiving station.

Summary of methods used to extract and display bathymetric data

JASCO has acquired a copy of the NOAA ETOPO5 dataset. The set contains topography and bathymetry for the entire world at intervals of 5 minutes of arc. The latitudinal (north-south) separation of data points is constant at 9.3 km. The longitudinal (east-west) separation of data points varies, as a function of latitude, from 0 at the poles to 9.3 km at the equator. The topographic and bathymetric measurements are to the nearest metre, with water depths being negative and land elevations being positive. At present, the topographic and bathymetric data are in scalar form. By scalar form it is meant that each lat./lon. position has one value assigned to it, and there is no logical or physical association between adjacent points.

The process of picking data points at intervals specified by constant angular measure leads to map distortion when the data points are plotted as functions of linear distance. Implicit in the sampling of topographic data by angular measure is the assumption that a unit of measure is independent of the direction and latitude. Lines of longitude converge towards the poles, and the assumption of constant angular separation leads to an exaggeration of the size of polar regions. The ETOPO5 dataset gives a view of the world as if the Earth's surface had been projected onto the inner surface of a right circular cylinder that is coaxial with the line joining the North and South geographic poles. This type of projection, known as a Mercator projection, is orientation preserving. An orientation preserving map projection is one where the angular relationship between points on the map is the same as that on the surface of the Earth, but that the areas of regions are not true relative to one another.

Two methods were derived to compute the great circle trajectories of sound 'rays' that would travel across the world's oceans. One is an incremental algorithm, implemented in the programming language ADA, that continually resets the range and bearing to the destination point after 10 km increments of range. The other method solves for the line of intersection of a plane, coincident with the centre of the Earth, and the Earth's surface. Both the sphere representing the Earth and the plane of intersection are expressed as functions of spherical co-ordinates. With this form of co-ordinate geometry, it is easy to compute the coefficients of the plane that contains the end points of the arc that joins two points on the surface of a sphere.

Both methods outlined in the previous paragraph generate sets of lat./long. pairs that are used as 'keys' into the dataset. Bathymetic data values are selected from the dataset at the points specified by the co-ordinate pairs. Four bathymetric profiles were extracted for raypaths between the Hawaii source and the four aforementioned receiving points on Canada's west coast. In addition to the four seafloor depth-vs-range plots, coloured contoured bathymetric plots of the northeast Pacific Ocean basin were also reproduced in Figures 1 and 2. This was done in order to give a feel for the bathymetry beyond that shown in the simple two-dimensional plots.

Arrays and ATOC

Because of the large transmission distances involved in the ATOC project the signal strength that may be expected at the receiving sites is not likely to be large. The mean sound pressure level observed off the coast of California during the Heard Island Feasibility Test (HIFT) was (63.8 ± 2) dB//1μPa. This sound pressure level corresponds to a mean transmission loss of (150 ± 3) dB and a mean signal to noise ratio (for noise in a 1 Hz band) of (-16.4 ± 2) dB. The sound pressure levels likely to be realized in ATOC can be expected to be comparable to those observed in HIFT. It has been proposed that the transmissions from the transducer at Kauai be limited, because of concerns for the oceanic mammal populations, to a level below that used in HIFT. However, the transmission loss from Kauai to the west coast of N. America will undoubtedly be less than that measured in HIFT. If the reductions in source level and transmission loss are comparable, the signal levels in ATOC will not differ appreciably from those measured in HIFT. Any means of increasing the gain of the receiver plays an essential role in the eventual success of the study. Several advantages can be achieved by deploying arrays of hydrophones rather than single-element receivers, since properly phased combination of the signal from multiple hydrophones can enhance the signal to noise ratio as well as providing directional information on the received signals. The deployment of arrays, however, poses greater technical challenges than that of single transducers, in terms both of structural complexity and of signal processing, monitoring and/or recording requirements. A careful assessment of the advantages offered and the difficulties posed by various configurations of the listening elements must therefore be carried out. Ultimately the optimal solution may not be unique but rather depend on the depth, location and environmental surroundings of a specific installation.

When used to implement acoustic beamforming, linear arrays are only capable of resolving directions of arrival relative to their longitudinal axis, thereby identifying, in an infinite and homogeneous medium, a conical surface where the source may be located. However, at long range, in an inhomogeneous and stratified ocean, only the arrival direction of the sound energy may be identified. Thus a vertical array will provide information as to the vertical angle of arrival of the sound, whereas a horizontal array will identify the bearing from which the sound is being received. When dealing with transmissions over long distances, these directions are not necessarily indicative of the actual source location but rather of the path or paths followed by the sound in reaching the receiver. This is particularly true in a vertical plane because of thermocline and salinity stratification effects, which may cause substantial bending of the path followed by the signal as it travels through different layers.

A vertical array, being capable of identifying the vertical angle of arrival and resolving multiple arrivals from different depths, is most suitable to extract the modal components of the signal. In view of the purpose of the ATOC project, which is to study the long-term changes in the ocean climates as reflected by changes in sound propagation, modal information would appear to be especially useful. Knowledge of the propagation modes of the received signal may let one determine which depths are being sampled by the sound, and changing temperature patterns may affect in a particularly perceptible manner the distribution of modal components. The ability to resolve individual signals incoming from different vertical angles also helps eliminate the ambiguities in time of arrival associated with multipath propagation, thus allowing a more reliable determination of time of travel. From a mechanical point of view, a vertical array can be deployed in a relatively simple fashion, relying on buoyancy to keep one end of the array tensioned, while the other end is either directly or indirectly anchored to the bottom.

The singular advantage that horizontal arrays would have in an ATOC application is not so much related to their ability to pinpoint the direction of arrival of the transmitted signal but rather their capacity to block interfering noise from other sources. Shipping noise, a major source of interference with the signals from an ATOC transmitter because of its broad frequency spread, is received as a signal highly directional in azimuth, and can be very efficiently cancelled out by a horizontal array through selective beamforming. The SNR gain that can be achieved is much greater than for a vertical array, whose exclusively vertical directivity would be of little advantage here. Data obtained in the course of past studies involving two arrays from DREP, the horizontal towed array COAMS and the vertical array MEVA, indicates that COAMS (using 64 hydrophones) could achieve a 10 to 20dB SNR gain over MEVA (using 16 hydrophones), because the former could discriminate and remove horizontally directional ship noise, while the latter could not. This would seem to be the strongest point in favour of horizontal arrays, and perhaps a determining factor in the choice of receiver geometry for listening locations where shipping noise substantially dominates the possibly faint signal from the transmitter. The engineering difficulties associated with the deployment of a fixed horizontal array, however, appear substantially more challenging than for a vertical array. One of the most important considerations is that the array, in order to provide reliable beamforming, must be as stable as possible: both in location and geometrical shape. A problem that was encountered during the analysis of HIFT data carried out by JASCO was that the shape of the COAMS towed array was not stable, but varied with such parameters as ship speed and course. This lessened the accuracy of beamforming over extended periods of time but, more importantly, introduced Doppler distortions in the signal. A fixed horizontal array could be assembled as a line of hydrophones individually anchored and supported by submerged buoys, but ensuring that the hydrophones remain on a straight line might prove difficult if strong currents are present. Physical implementation is a very substantial drawback of horizontal arrays.

Possibly the best approach, at this time, to choosing the optimum type of array for reception of signals from Kauai is to install one vertical line array when transmissions begin at Kauai and examine the vertical angular structure of arrivals. If these appear to be stable and resolvable it may then be possible to replace such an array for use on the longer term, by one or several autonomous receivers equipped with one or a small number of hydrophones.

A qualitative best site

If a vertical listening array mounted at nominally 1,000 m depth and connected by cable to shore is envisaged as meeting the requirements of an ATOC receiver, it is of interest to speculate where this might be placed.

In general, the distance from the west coast shoreline of Vancouver Island to the 1,000 m depth contour, is much greater to the south of the island than it is to the north. From Cape Cook, where the shortest distance, 13 nm, to the 1000 m contour is to be found, the distance increases progressively as one proceeds south until the distance seaward off Ucluelet is 43 nm. To the north, the distance to the light stations at Cape Scott and Quatsino is approximately 20 nm. Since there is no light station at Cape Cook, it would seem easiest and most economical to bring the hydrophone array cable ashore at Quatsino light. It would be necessary, of course, to carry out a small bathymetric survey near the approaches to the light station to ensure that a path for the cable, free of significant wave action, can be found. Laying the cable can be carried out with Canadian Government vessels. Some protection of the cable may be required where the cable emerges from the sea.

Fish boat distribution off the Canadian West Coast.

In order to assess the acoustic interference likely to be generated by the Canadian West Coast salmon fishing fleet at any ATOC receiver situated off the Canadian West Coast, records of fish boat activity throughout a fishing season (April 1 to September 30, 1992) were compiled. Radar surveillance of the fishing fleet, and other shipping, is carried out on a continuous basis by Fisheries & Oceans using a radar sited atop a mountain near the Ucluelet Coast Guard station. Daily records of the areal distribution of fishing boats are thus available. A typical record is shown in Figure 5. It was planned to use these records to produce contour plots of the areal density of fish boats of the type shown in "A Computer Model of Merchant Shipping in the Mediterranean Sea"[3] Unfortunately, it transpired that the dotted representations of the fish boats did not accurately correspond to the radar "blips" observed but were included on the chart to provide only a qualitative representation of the fish boat distribution. The numbers listed for areas designated in the radar count charts (23, 24, 25 etc.) are more accurate. It would appear worthwhile to expend more effort in the recording of the radar observations and produce areal number density plots.

Conclusions

Bathymetric data for the NE Pacific Ocean at east and west intervals of 5 minutes of arc have been compiled in computer files. This data permits the derivation of bathymetric sections between Kauai, Hawaii and arbitrary sites along the Canadian west coast for use in determining sound propagation characteristics.

If autonomous receiving stations turn out not to be feasible, it may be necessary to bring the signals ashore by use of a cable. In this event, because of the lack of habitation along the Canadian west coast shoreline, it will probably be necessary to bring the cabled acoustic data to shore at Canadian Coast Guard light stations, and subsequently to transmit data to DREP using land lines. Accordingly, the Coast Guard light station characteristics, facilities and landfall types have been compiled as a database for any future installation.

Examination of the bathymetry off the west coast of Vancouver Island suggests that the best site for a hydrophone array connected by cable to shore is to be found westward of Quatsino light station. A hydrophone array, mounted at a depth of 1000 m, would require a cable some 20 nm in length, to reach the light station. The bathymetry in the direction of Hawaii approximates to that shown for Cape Scott in Figure 3.

Because of possible interference posed by fishboats at the ATOC receiver(s), data yielding fishboat coastal areal distributions have been compiled at Annex I. It was planned to produce contoured number density plots for the summer fishing season, however, the nature of the data precluded this.

A proposal to the US Advanced Research Projects Agency to carry out a study of sound propagation between the island of Kauai and the Canadian west coast was submitted but was not accepted.

Recommendations

Contoured quantitative number density plots for Canadian coastal salmon fishing boats plying off-shore during the salmon fishing season should be produced in a manner similar to that described in "A Computer Model of Merchant Shipping in the Mediterranean Sea".[3]

Noise production of oil tanker traffic plying between Valdez Alaska and Cherry Point, Seattle, along routes to the west of Vancouver Island should be measured at potential sites for ATOC receivers.

Design studies should be carried out for autonomous, long life, listening arrays for use in ATOC; possibly followed by production of a prototype.

References

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J. Scrimger, D.J. Evans,and W. Yee
J. Acoust. Soc. Am. 85(2)1989

2. "Heard Island Feasibility Test : Analysis of Pacific path data obtained with a horizontal array"
Garry J. Heard and N.R. Chapman.
J.Acoust. Soc. Am. 96 (4) October, 1994.

3. "A Computer Model of Merchant Shipping in the Mediterranean Sea"
P. Scrimger, R.M. Heitmeyer and P. Boulon.
Saclant Undersea Research Centre Report SR164 1990

FIGURES

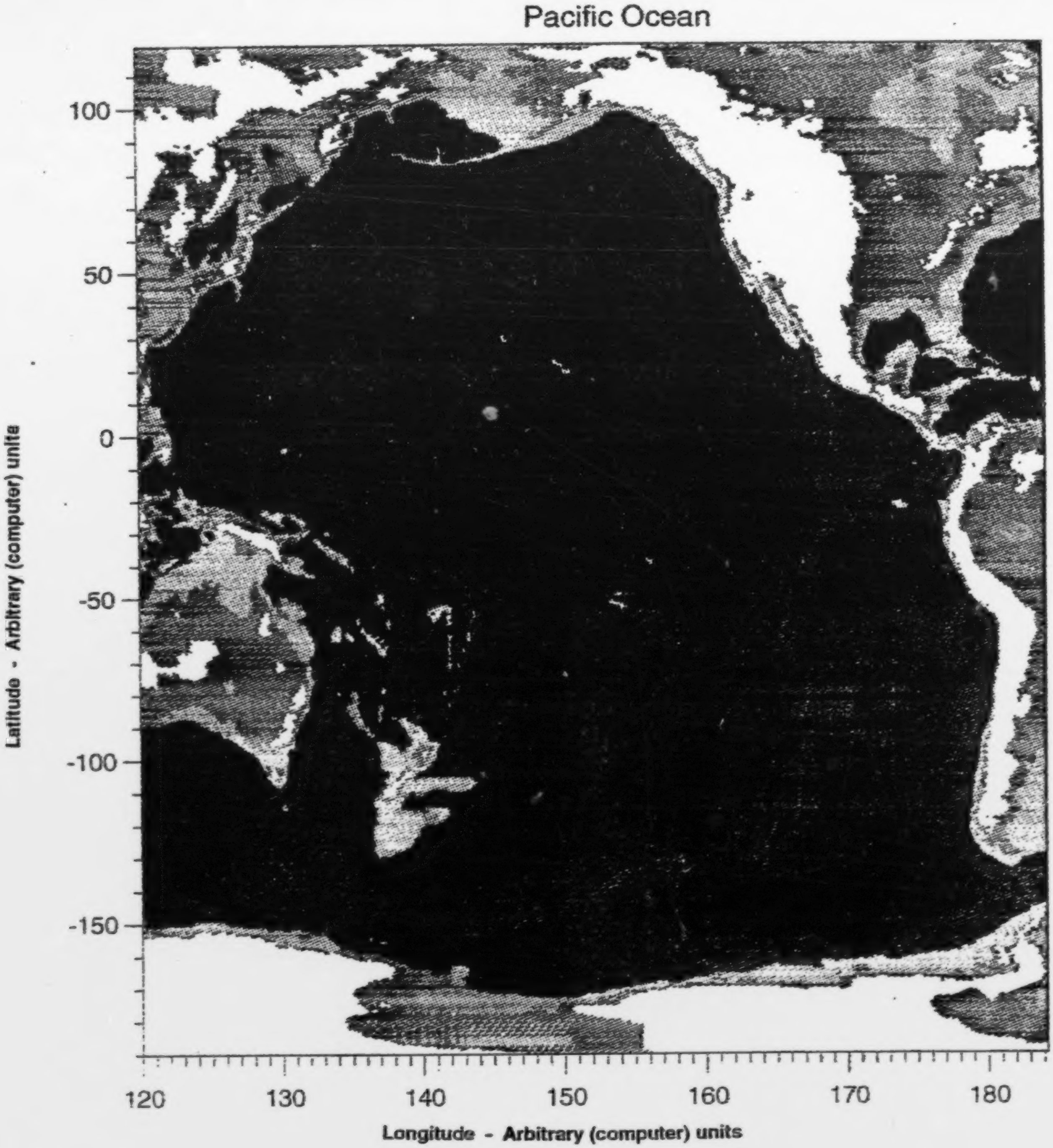

Pacific Ocean
100
50
0
-50
-100
-150
120
130
140
150
160
170
180
Latitude - Arbitrary (computer) units
Longitude - Arbitrary (computer) units

Figure 1 Bathymetry of the Pacific Ocean using the NOAA ETOP5 dataset.

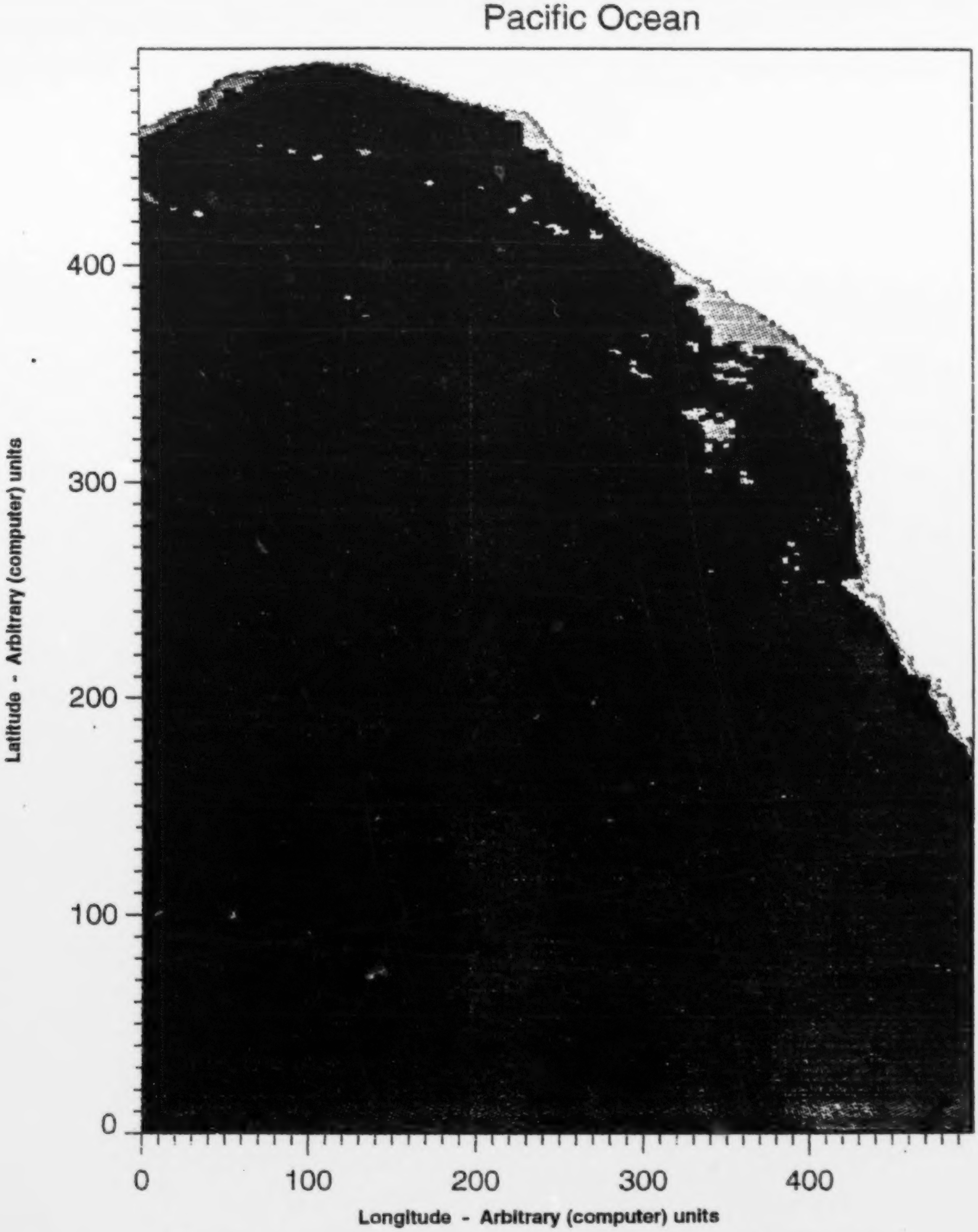
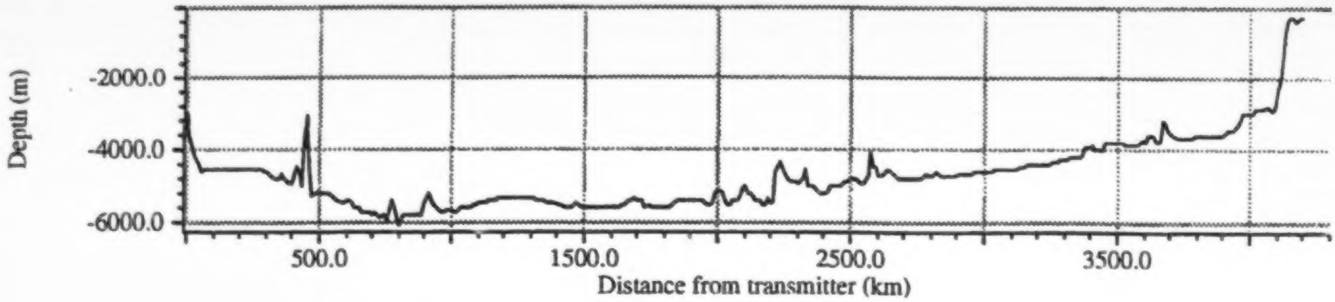
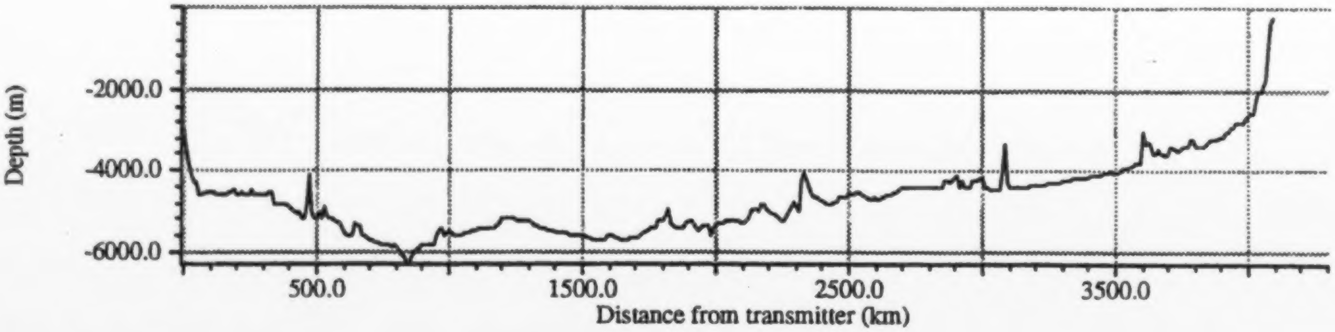

Pacific Ocean
400
300
200
100
0
Latitude - Arbitrary (computer) units
0
100
200
300
400
Longitude - Arbitrary (computer) units

Figure 2 Bathymetry of the NE Pacific Ocean using the NOAA ETOP5 dataset.

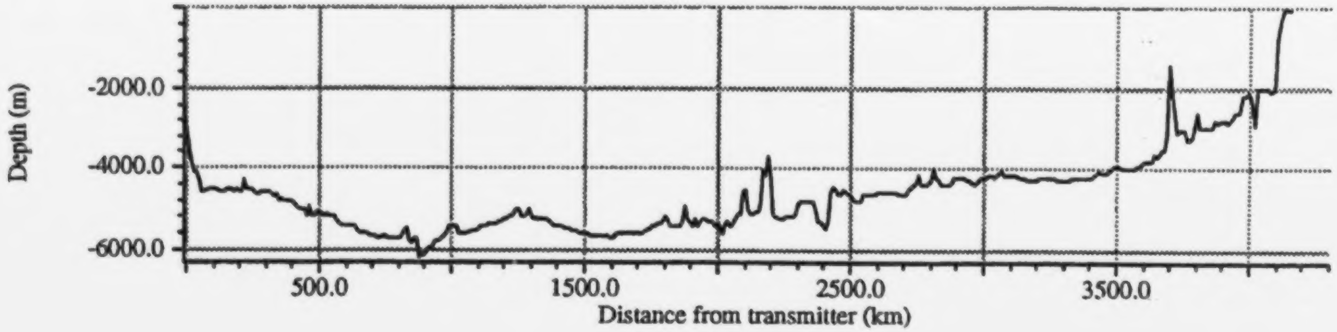
Kauai Langara Light



Kauai Cape St James



Kauai Cape Scott



Kauai Ucluelet

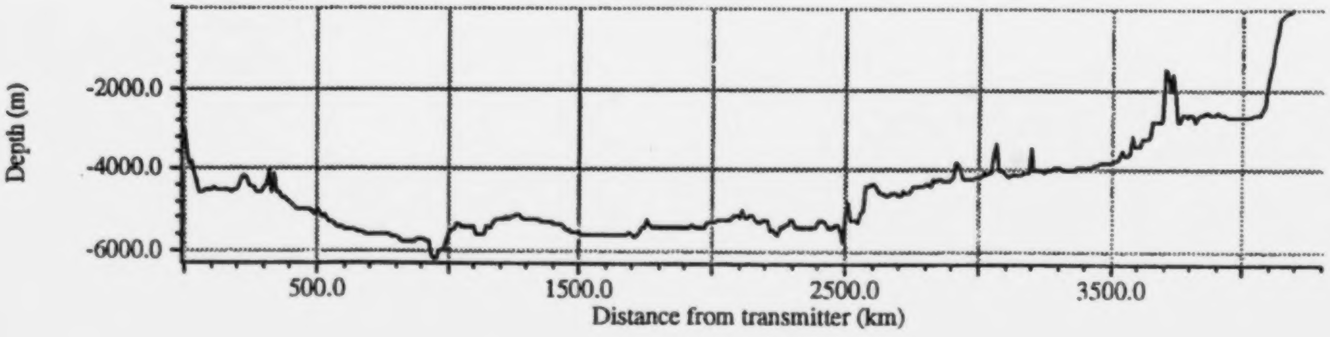
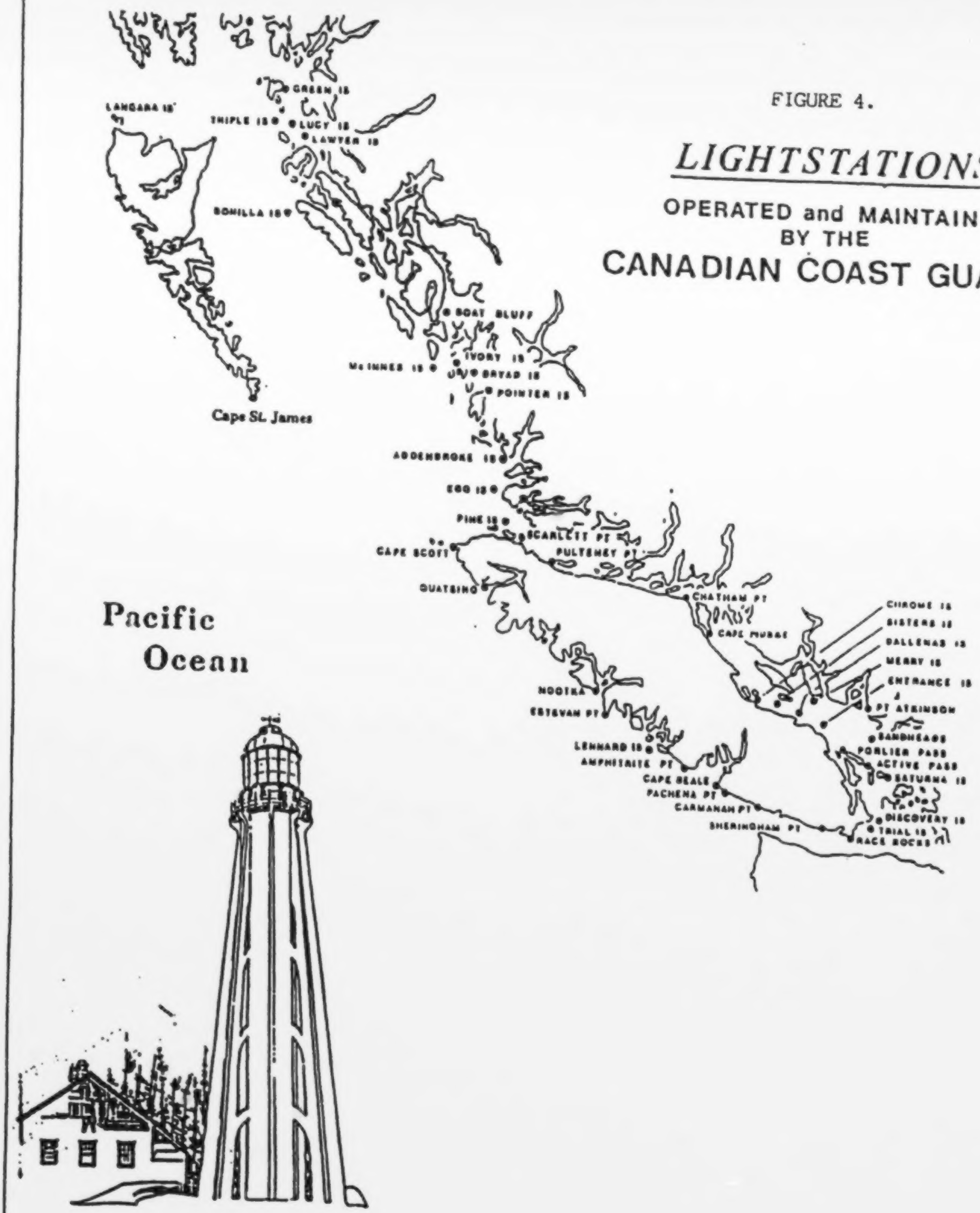


Fig. 3. Bathymetric sections between Kauai and Canadian Coast Guard light stations at Langara, Cape St. James, Cape Scott and Ucluelet.

FIGURE 4.

LIGHTSTATIONS

OPERATED and MAINTAINED BY THE CANADIAN COAST GUARD



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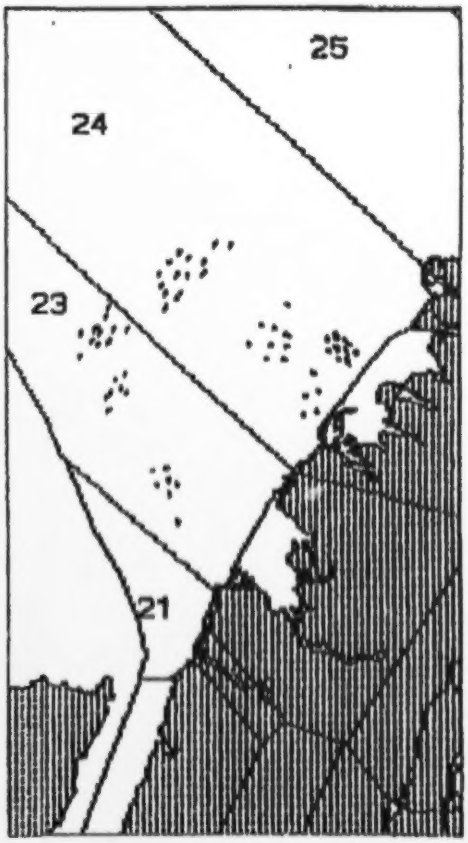
RAD2608(1)

UCLUELET RADAR COUNTS

Observer: Barbara Illerbrun
Date: Day: 26 Month: 08 19: 92
Time: (24 hr clock): 0800
Windspeed (knots/hr):
Amphitrite: NW 5 Estevan: NW 14

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	1
53	2
Total	3
Area 23	
Sub 55 (7 & 12 mile)	10
57 (20 mile)	17
58 (South Bank)	7
59 (Big Bank)	22
113 (Finger Bank)	3
Total	59
Area 24	
Sub 60 (La Perouse)	1
61	15
62 (Portland Pt)	37
63	9
64 (Estevan Pt)	2
65	2
Total	66
Total for SWTR	128



Comments: Fog

Fig. 5 Example of a record of the Ucluelet Radar Counts and distribution of fishboats for 26 August, 1992.

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Appendix I

Characteristics and Facilities of Canadian Coast Guard Light Stations.

ACKNOWLEDGEMENT

The material contained in this Appendix, as well as Figure 4, was obtained from the library of the Canadian Coast Guard facility in Victoria, BC by kind permission of Captain A.J.Provan.

ngara Point diobeacon	On NW. point of Langara Island. 54 15 23 133 03 30	W	Fl	48.8	......	D,1,electric (M.V.)	White hexagonal tower. 9.1	1913 Flash every 5 s 1983 Visible from 055° through E. and S. to 265°. Emergency light 1913 Horn - Blast 6 s; silence 54 s 1972 Horn points 329°.
pe St. James diobeacon	On the cape, St. James Island. 51 56 10 131 00 52	W	Fl	96.0	17	D,electric	Square tower.	1914 Flash every 5 s 1987 Visible 207° through W., N. and E. to 122°. Chart:3825
pe Scott diobeacon	On NW. tip of Vancouver Island. 50 46 57 128 25 32	W	Fl	76.2	21	D,electric	Square skeleton tower. 4.0	1927 Flash 0.3 s; eclipse 9.7 s 1983 Visible from 344° through N., E. and S. to 246°. Emergency light. 1961 Horn - Blast 2 s; silence 3 s; blast 2 s; 1972 silence 3 s; blast 2 s; silence 48 s Horn points 290°. Chart:3598
atsinq diobeacon	On SE. end of Kains Island. 50 26 29 128 01 51	W W	Fl F	27.4	17	D,electric	White circular tower.	1907 Flash 0.14 s; eclipse 4.86 s 1977 Visible from 224° through W., N. and E. to 104°. High intensity flash superimposed every 5 s Emergency light 1923 Horn - Blast 3 s; silence 27 s 1973 Horn points 140°. Chart:3618
ootka	On summit of San Rafael Island. 49 35 35 126 36 51	W W	F Fl	31.1	16	Electric	Red square skeleton tower. 9.8	1911 Flash 0.15 s; eclipse 11.85 s 1984 High intensity flash superimposed every 12 s Visible from 192° through W. and N. to 069°. Emergency light 1928 Horn - Blast 3 s; silence 3 s; blast 3 s; 1978 silence 51 s Horn points SE. Chart:3664
stevan Point adiobeacon	SW. extremity of point at Hole-in-the Wall. 49 23 00 126 32 32	W	Fl(2) 15 s	36.1	18	Electric	White octagonal tower. 30.5	1907 Flash 0.38 s; eclipse 2.12 s; flash 1980 0.38 s; eclipse 12.12 s Emergency light 1908 Diaphone - Blast 5 s; silence 55 s 1972 Horn points 210°. Chart:3640
ennard Island	On SW. point of island. 49 06 38.5 125 55 20	W	Fl	33.8	18	Electric	White circular tower, red band at top. 17.8	1904 Flash 0.28 s; eclipse 9.72 s 1988 Visible from all points of marine approach, except where obscured by trees on island. Emergency light 1908 Diaphone - Blast 3 s; silence 3 s; blast 1972 3 s; silence 51 s Horn points 210°. Chart:3685
mphitrite Point	On extremity of point, entrance to Ucluelet Harbour. 48 55 17 125 32 23	W	Fl	15.2	16	Electric	White rectangular tower. 6.1	1905 Flash 0.4 s; eclipse 11.6 s 1989 High intensity flash superimposed every 12 s. Emergency light 1927 Horn - Blast 2 s; silence 18 s 1978 Chart:3646

Chart 1 Position and operational characteristics of west coast light stations.

pe Beale ctor idiobeacon	SE. point of Barkley Sound entrance. 48 47 12 125 12 50.8	W R W R	F Fl	50.8	15	Electric	Red skeleton tower, white slatwork daymarks on 3 sides. 9.7	1874 1985 1908 1979	Flash 0.14 s; eclipse 4.86 s Visible from 311° through N., E. and S. to 182°; white 311° to 097°; red 097° to 182°. High intensity white and red flash superimposed every 5 s Emergency light Horns (2) - Blast 3 s; silence 27 s Horns point SW. and NW. Horns sound in unison. Chart:3671
armanah ladiobeacon	On point. 48 36 43 124 44 59.9	W	Fl	55.6	19	D,electric	White octagonal tower. 9.1	1891 1981 1960 1978	Flash 0.15 s; eclipse 4.85 s Emergency light Horn - Blast 2 s; silence 3 s; blast 2 s; silence 3 s; blast 2 s; silence 48 s Horn points 155°. Chart:3606
Sheringham Point	On point. 48 22 37.1 123 55 11.1	G	Fl	21.9	......	Electric	White hexagonal tower. 19.5	1912 1981 1925 1976	Flash 0.15 s; eclipse 14.85 s Emergency light Horn - Blast 6 s; silence 54 s Chart:3606

CAPE SCOTT

LL 66

A light was first established at Cape Scott in 1927; however, it was a minor, unwatched light and a lightstation was not established there until 1960. The navigational aids consisted of a light, fog horn and radio beacon. As the type F diaphone could not be heard to the north, an Airchime KM.110/85 horn, synchronized with the diaphone was added in 1964. A Stone Chance 400 watt electronic horn was established in 1972 and a second in 1973. These horns were still found to be inadequate and were replaced with Airchime Model E135 horns. In 1990 electronic horns type API.-CG1000 were introduced to the station, thus enabling air compressors to be removed.

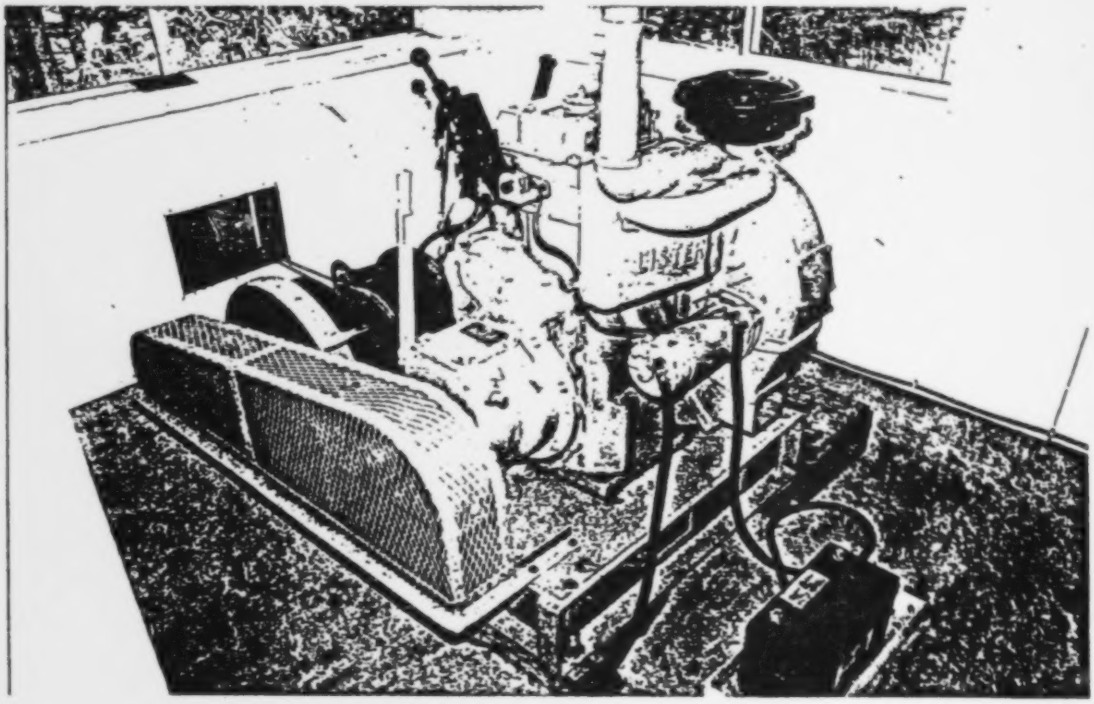
The station, including the engine room was built about one-third of a mile from the original light on the point, but the electronic fog signals have been located on the point and hence can be heard more easily by mariners. The engine room was renovated and modernization equipment added in July 1979. In September 1981 the DCB 36 main light was replaced with an AGA PRB 21 light, at the same time the tower was replaced and an FRP lantern house added.

Cape Scott is on the north-western tip of Vancouver Island and the traffic passing consists of fishing, deep sea coastal vessels. There were three lightkeepers on the station, but these have now been reduced to two.

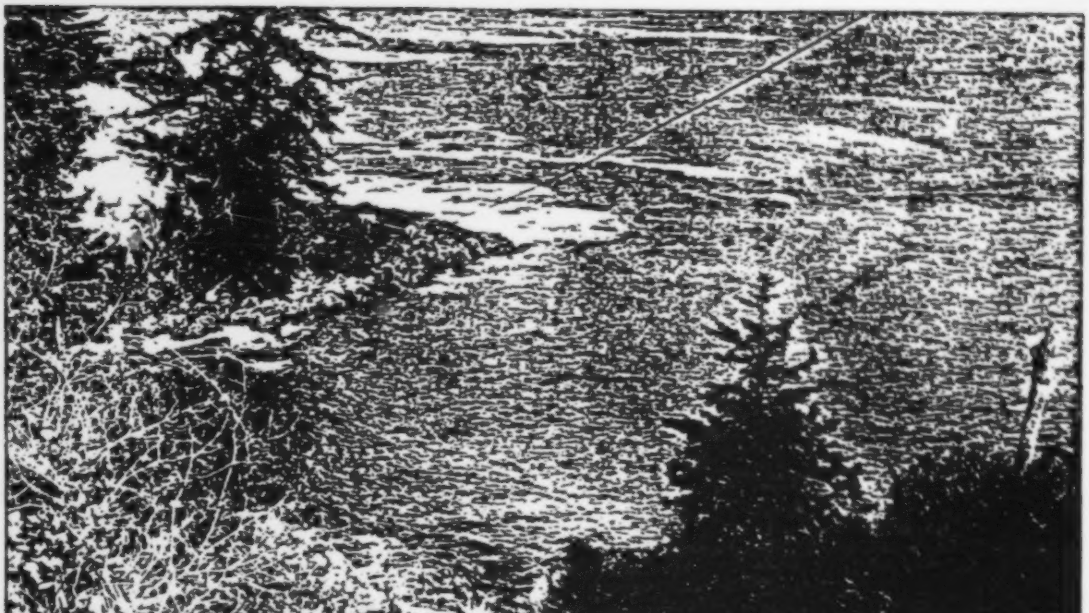
Access to the station is by ship or helicopter, there being an aerial hoist and a 36' X 48' helicopter pad. A road runs from the aerial hoist landing to the station and to the beach, but there is no road access to the outside.

EQUIPMENT	ENGINE CONTROL PANEL
MAKE AND MODEL	MECHRON
VOLTAGE	230/115
KW	25 KW
SERIAL NO.	X2638
T.NO.	
PHASE	1

EQUIPMENT	GENERATORS
GENERATOR # 1	
MAKE AND MODEL	STAMFORD C234C
SERIAL NO.	D 2647/3
T.NO.	T134073
VOLTAGE	240/120
AMPS	130AAC
KW	25 KW
RPM	1800 RPM
PHASE	1
REGULATOR	
BEARING	
BATTERY CHARGER#1	SAB NIFE SCB 120-12-10
SERIAL NO.	103835
T.NO.	
VOLTS IN	120VAC
VOLTS OUT	12 VDC
AMPS OUT	10 ADC
BATTERIES	D8 1988/7 287A
GENERATOR # 2	
MAKE AND MODEL	STAMFORD C234C
SERIAL NO.	
T. NO.	T134060
VOLTAGE	240/120
AMPS	130AAC
KW	25 KW
RPM	1800 RPM
PHASE	1
REGULATOR	
BEARING	
BATTERY CHARGER#2	SAB NIFE SCB 120-12-10
SERIAL NO.	103833
T.NO.	
VOLTS IN	120VAC
VOLTS OUT	12 VDC
AMPS OUT	10 ADC
BATTERIES	8D 1988-6-286



AERIAL WINCH.



AERIAL LANDING AREA

QUATSINO LIGHTSTATION

LL - 68

Quatsino, or Kains Island Lightstation as it is locally known, is on the southeast end of Kains Island at the mouth of Quatsino Sound. The light was established in 1907 and the fog alarm added in 1923.

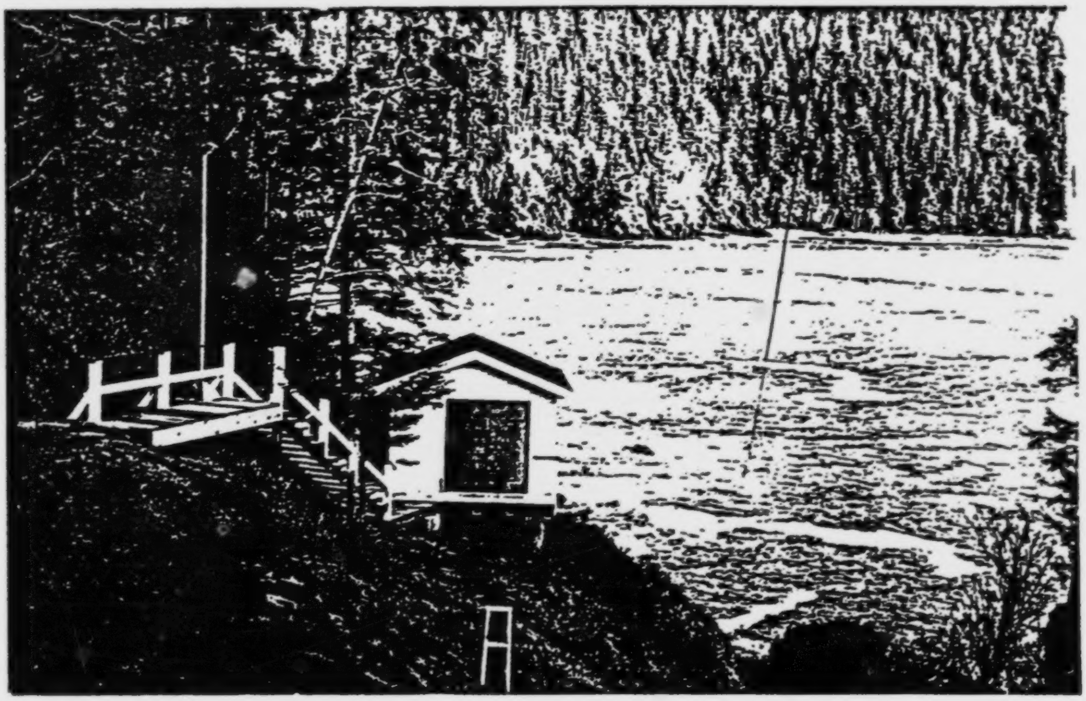
The station presently consists of an engine room, housing the diesel generators. An adjacent room houses the radio beacon. A 28' high by 7' diameter fibreglass tower mounted at the seaward end of the engine room supports the lights and fog alarm equipment. There are three dwellings, but only two keepers; the spare dwelling being used for work crews when at the station. There are several small outbuildings and a timber helicopter pad 26' x 45' on a rock knoll adjacent to the station. There is also an aerial hoist at the station for landing materials and supplies.

Traffic passing the station is primarily commercial, both deep sea ships bound for the Rayonier pulp mill at Port Alice and freighters bound for Utah Copper Mine at Coal Harbour as well as coastal traffic bound for Holberg and other smaller communities. In addition, there are log tows and many fishing vessels entering and leaving the sound for Winter Harbour, a major fishing centre during the season, and some six miles from the lightstation.

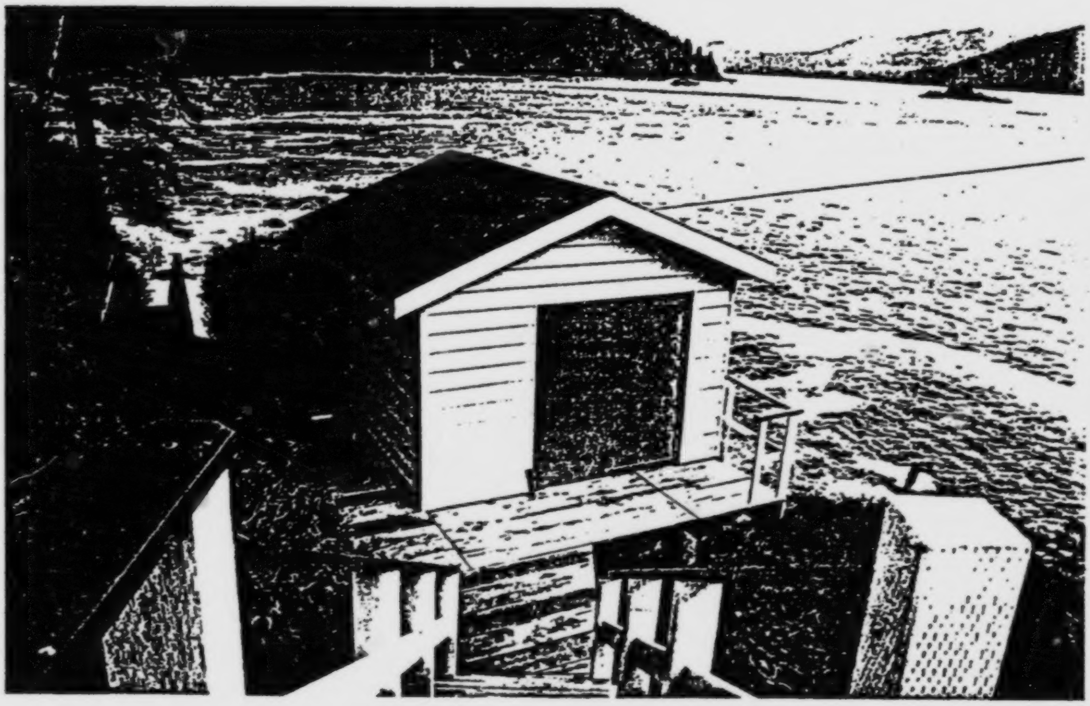
The fog signal was originally a Type F Diaphone and was replaced by a Stone Chance 400 watt electronic horn and, when this proved to be inadequate, two other Stone Chance 400 watt horns were added. Users, particularly the commercial fishermen, found the existing 1200 watt electronic horn combination inadequate so it was replaced by an Airchime E14 electronic fog signal with an output of 2400 watts.

Electric power is generated by two 20 KW diesel generators, and modernization equipment was installed and completed in March 1980.

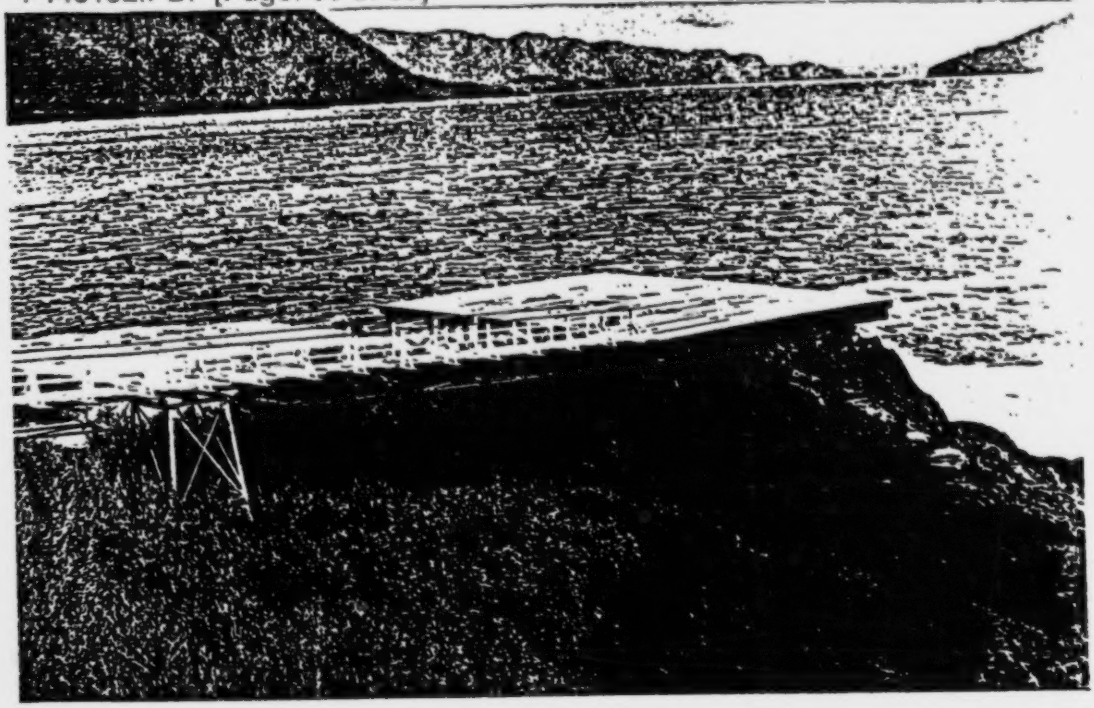
EQUIPMENT	ENGINE CONTROL PANEL
MAKE AND MODEL	MECHRON
VOLTAGE	120/240 VAC
KW	8.5 KW
SERIAL NO.	X2604
T.NO.	
PHASE	1
EQUIPMENT	GENERATORS
GENERATOR # 1	
MAKE AND MODEL	STAMFORD C20B
SERIAL NO.	D1860/4
T.NO.	T134078
VOLTAGE	120/240 VAC
AMPS	104 A
KW	20 KW
RPM	1800 RPM
PHASE	1
REGULATOR	MK 2A
BEARING	
BATTERY CHARGER#1	VAPOR 70-4-172
SERIAL NO.	71030204E
T.NO.	
VOLTS IN	120VAC
VOLTS OUT	12VDC
AMPS OUT	8ADC
BATTERIES	VARTA 1990
GENERATOR # 2	
MAKE AND MODEL	STAMFORD C20B
SERIAL NO.	D1860/4
T. NO.	T134078
VOLTAGE	120/240 VAC
AMPS	104 A
KW	20 KW
RPM	1800 RPM
PHASE	1
REGULATOR	MK 2A
BEARING	
BATTERY CHARGER#2	VAPOR 70-4-172
SERIAL NO.	7110141-E
T.NO.	
VOLTS IN	120 VAC
VOLTS OUT	12 VDC
AMPS OUT	8 ADC
BATTERIES	D8 252A 88-8



WINCH HOUSE & LANDING AREA.



WINCH HOUSE (BUILT 1990)



Station Helicopter Pad.

Senior Keepers Dwelling

NOOTKA LIGHTSTATION

LL 105

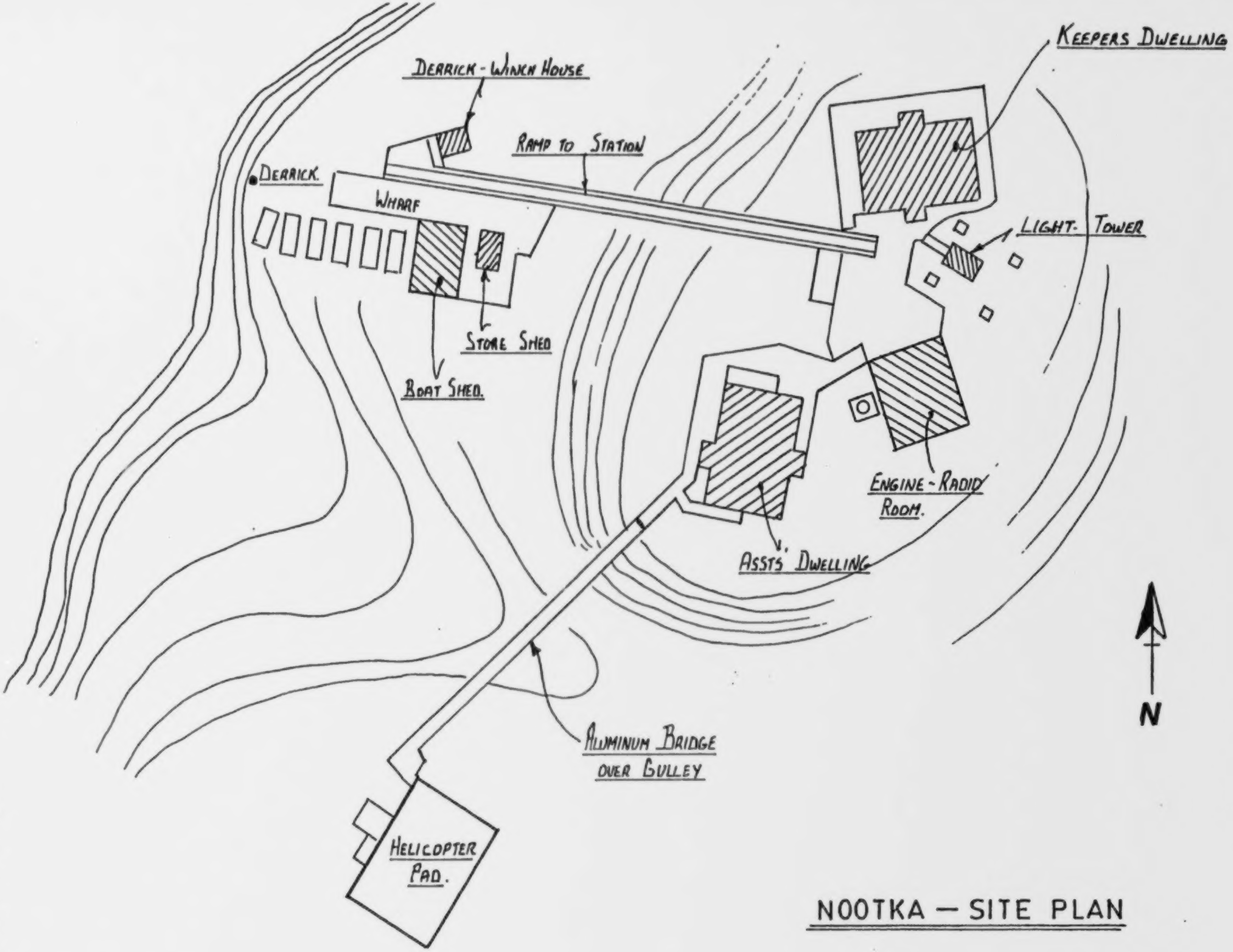
Nootka Lightstation is in a historic location and in 1911 was established on the summit of San Rafael Island adjacent to Friendly Cove to guide ships to and from Nootka Sound, a busy mining and logging area. Friendly Cove was the site of the Nootka Convention between Britain and Spain and also the first spot in British Columbia where a European set foot when Captain Cook landed here in 1778.

A type F diaphone was added in 1928 and in 1978 it was replaced by a dual Airchime KM110/85 Air Horn powered by electrically driven compressors. Two 20KW diesel generators produce all the power requirements for the station.

Land is at a premium on the island so that the 30' x 48' helicopter pad is built on another knoll and access to it is via a bridge. There are two dwellings and two lightkeepers on the station, but no spare dwelling is available for work crews etc.

The eight bulk fuel tanks have a storage capacity of 15,800 gallons of fuel, including 3,000 gallons of helicopter fuel storage. A derrick is mounted on the rocky shore to land material from a boat.

The wooden Engine Room was renovated and modernization equipment was installed in August 1978. The Radio Room equipment previously in a seperate building close to the engine room was installed in a room built onto the engine room in 1982. Also in this year a concrete helicopter drop off pad was built adjoining the Engine/ Radio Room.



NOOTKA – SITE PLAN

FACILITY	NOOTKA	L.L.#	105
KEEPER	ED KIDDER	COST CODE	8085
PHONE #	TOFINO RADIO PATCH 726-7716		
SYSTEM	ENGINE ROOM		

EQUIPMENT	DIESEL ENGINE 'A'
IDENTIFICATION#	T134031
TYPE	LISTER HR3
SERIAL#	2245HR3A24
H.P.	37.5
RPM	1800
BELT SIZE	N/A
SOLENOID TYPE	SYNCHRO-START
LIFT PUMP?	NO
OIL PRESS. IND.	MECH.OIL FILLED GAUGE
EXH.MANIFOLD	END OUTLET
MUFFLER	2 1/2"x8" x 30"
OIL FILTER	CH336PL
FUEL FILTER	C1191A

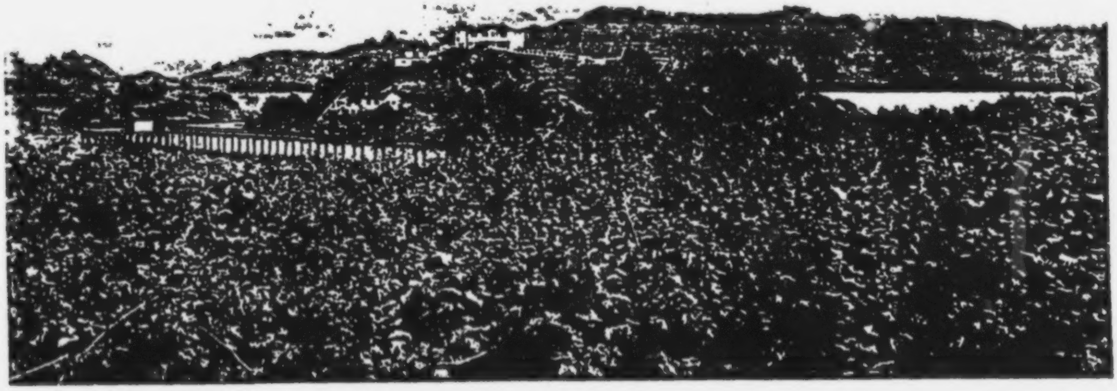
EQUIPMENT	GENERATOR
IDENTIFICATION#	T134086
TYPE	STAMFORD C20B
SERIAL#	D 1881/3
KVA	25

EQUIPMENT	DIESEL ENGINE 'B'
IDENTIFICATION#	T134017
TYPE	LISTER HR3
SERIAL#	2601HR3A24
H.P.	37.5
RPM	1800
BELT SIZE	N/A
SOLENOID TYPE	SYNCHROSTART
LIFT PUMP ?	NO
OIL PRESS. IND.	MECH.OIL FILLED GAUGE
EXH.MANIFOLD	END OUTLET
MUFFLER	2 1/2"x 8" x 30"
OIL FILTER	CH336PL
FUEL FILTER	C1191A

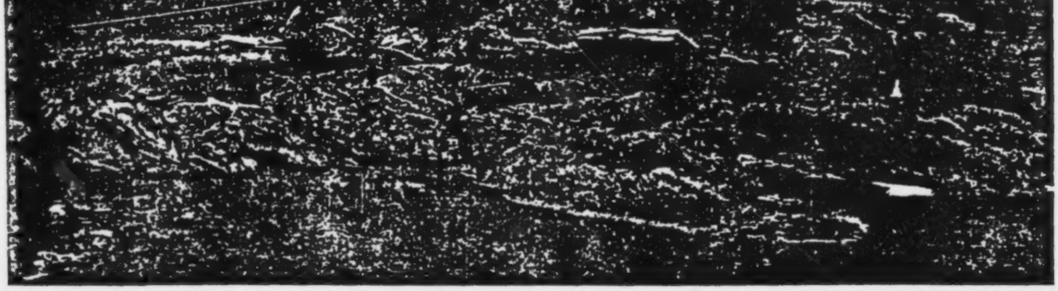
EQUIPMENT	GENERATOR
IDENTIFICATION#	T134075
TYPE	STAMFORD C20B
SERIAL#	D 1860/6
KVA	25

EQUIPMENT	ENGINE CONTROL PANEL
MAKE AND MODEL	CUMMINS
VOLTAGE	120/240 VAC
KW	20 KW
SERIAL NO.	CCG-3-10-20P-20KW-5
T.NO.	
PHASE	1

EQUIPMENT	GENERATORS
GENERATOR # 1	
MAKE AND MODEL	STAMFORD C20B
SERIAL NO.	D1881/3
T.NO.	T134086
VOLTAGE	120/240 VAC
AMPS	104 AMPS
KW	20 KW
RPM	1800 RPM
PHASE	1
REGULATOR	INTERNAL NUPART SX440
BEARING	
BATTERY CHARGER#1	VAPOR 70-4-172
SERIAL NO.	71030197E
T.NO.	T134086
VOLTS IN	120 VAC
VOLTS OUT	13.6 VDC
AMPS OUT	8 AMPS
BATTERIES	D8-87/1/236A
GENERATOR # 2	
MAKE AND MODEL	STAMFORD C20B
SERIAL NO.	D1860/2
T. NO.	T134077
VOLTAGE	120/240 VAC
AMPS	104 AMPS
KW	20 KW
RPM	1800 RPM
PHASE	1
REGULATOR	INTERNAL NUPART SX440
BEARING	
BATTERY CHARGER#2	SAB-NIFE SCB 102-120-10
SERIAL NO.	4725-64-08008-01
T.NO.	
VOLTS IN	120 VAC
VOLTS OUT	13.6 VDC
AMPS OUT	10 AMP
BATTERIES	DELCO 1150 89/03/302A

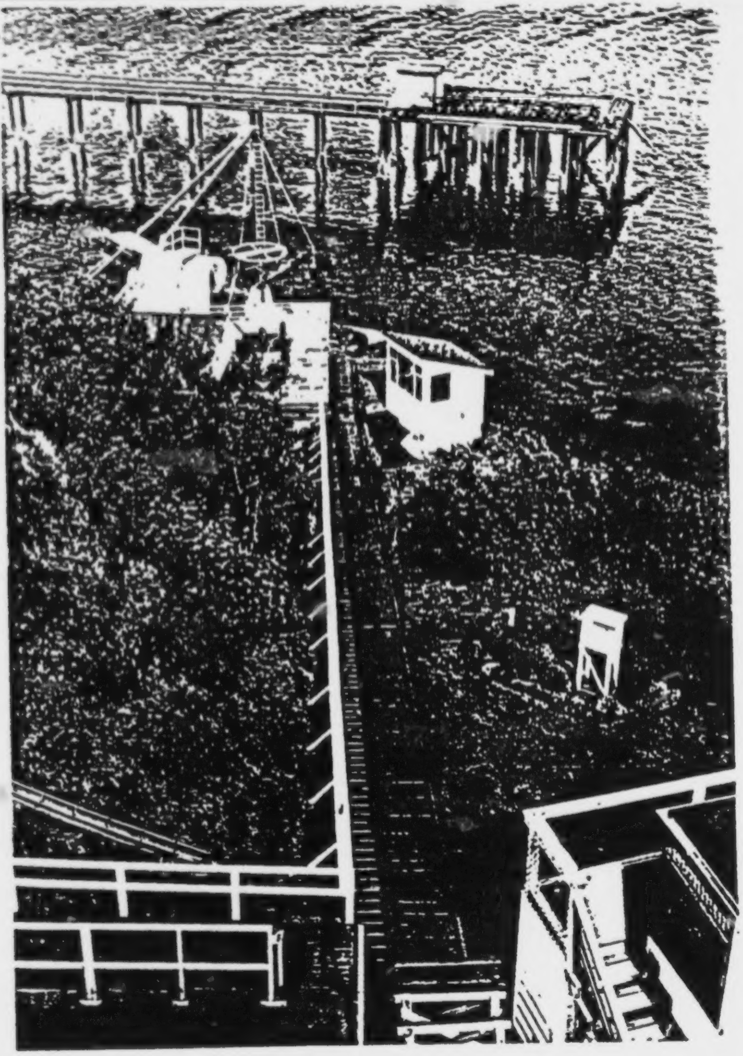


NOOTKA LIGHTSTATION.

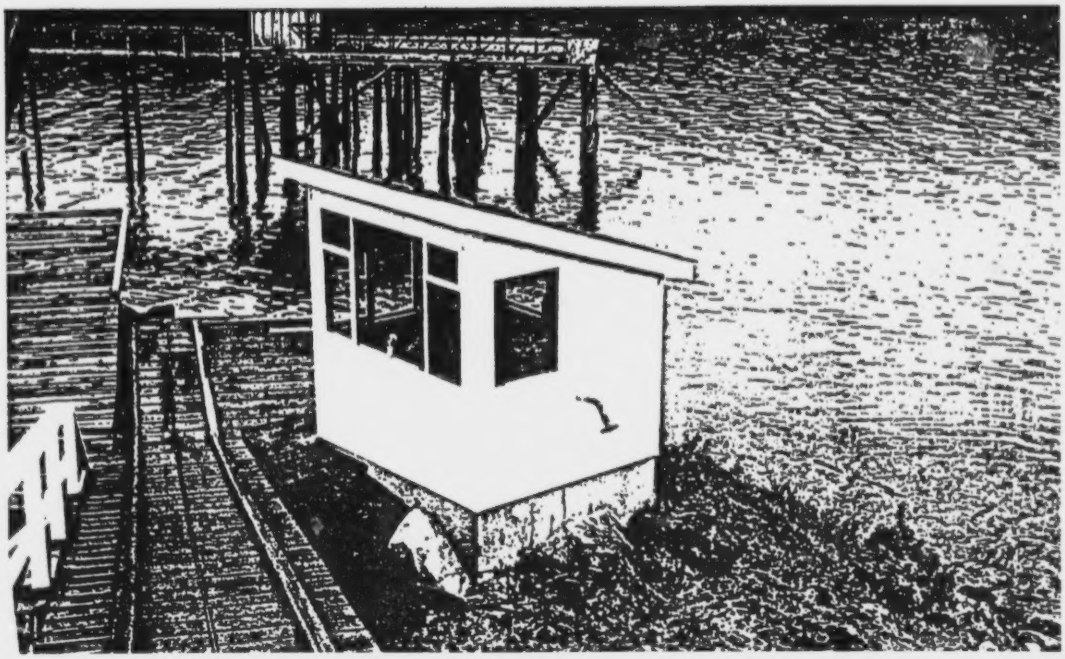


FRIENDLY COVE - ADJACENT TO STATION.

ENGINE & RADIO ROOM.



RAMP TO WHARF AREA



DERRICK.
CONTROL ROOM.

ESTEVAN POINT

LL 114

Estevan Point (formerly Breaker Point) was established as an aid to navigation in 1908. It is situated on the west coast of Vancouver Island, 13 miles from San Raphael Point, the entrance to Nootka Sound. It is a low, wooded projecting point bordered by a sandy beach and strewn with huge boulders and logs.

The light tower is 127 feet tall (the tallest in the Western Region). It is an impressive reinforced structure with eight concrete abutments. In 1982 the original dioptric light was replaced by an 'AGA' PRB.21 light. At the same time the old wooden fog alarm building was replaced with a concrete block building, housing an engine room, workshop and storage room. Power to the station is provided by two 75HP Lister/Stamford Generator sets.

The first fog horn was installed in 1908 and was steam operated. Later a diaphone horn was installed, which is still in operation, and operated by diesel driven air compressors. The fog horn equipment is housed in a concrete block building, adjacent to the new engine room.

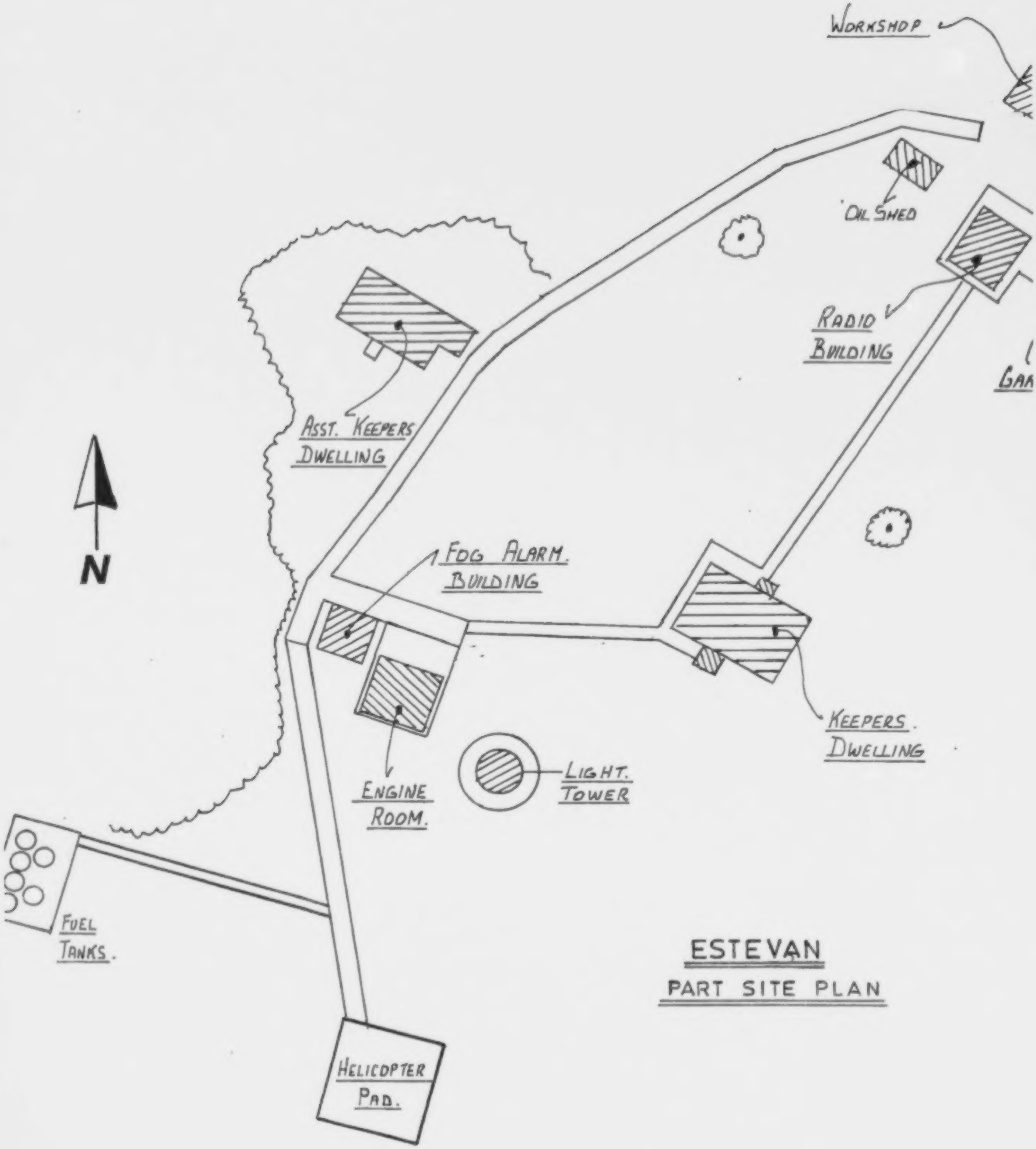
The station was also the centre for a large and important radio telegraphic system, which, during the Second World War, was one of the most important stations in the North Pacific. Probably for these reasons, on June 20, 1942, the station became the object of a one hour attack by a Japanese submarine, which failed to cause any damage.

In 1956 the radio station was discontinued, the facilities being relocated at Tofino Airport. At the same time, a meteorological station was established using the same building. This was in use until 1980 when the station was converted to automatic operation and the technicians left the site.

The station has been reduced in size, as in 1982 when the dwellings used by the now relocated meteorological technicians, were removed.

Estevan Point is now operated by two lightkeepers.

Book compiled June 1991



ESTEVAN
PART SITE PLAN

EQUIPMENT	ENGINE CONTROL PANEL
MAKE AND MODEL	MECHRON
VOLTAGE	120/240
KW	44.5 KW
SERIAL NO.	X3474
T.NO.	
PHASE	1

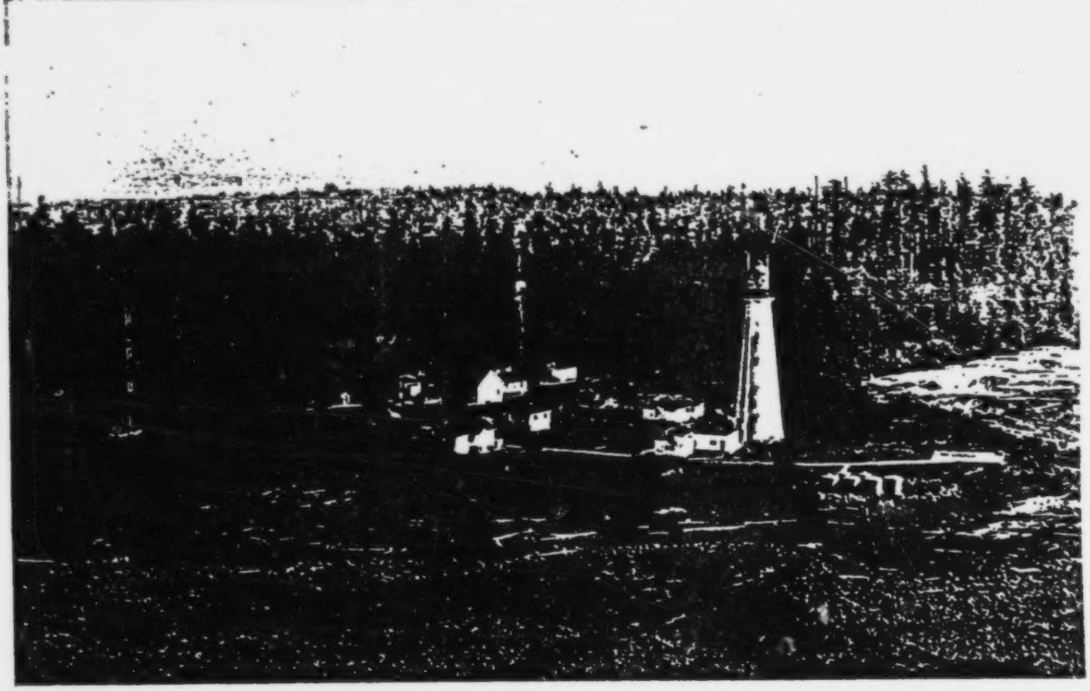
EQUIPMENT	GENERATORS

GENERATOR # 1

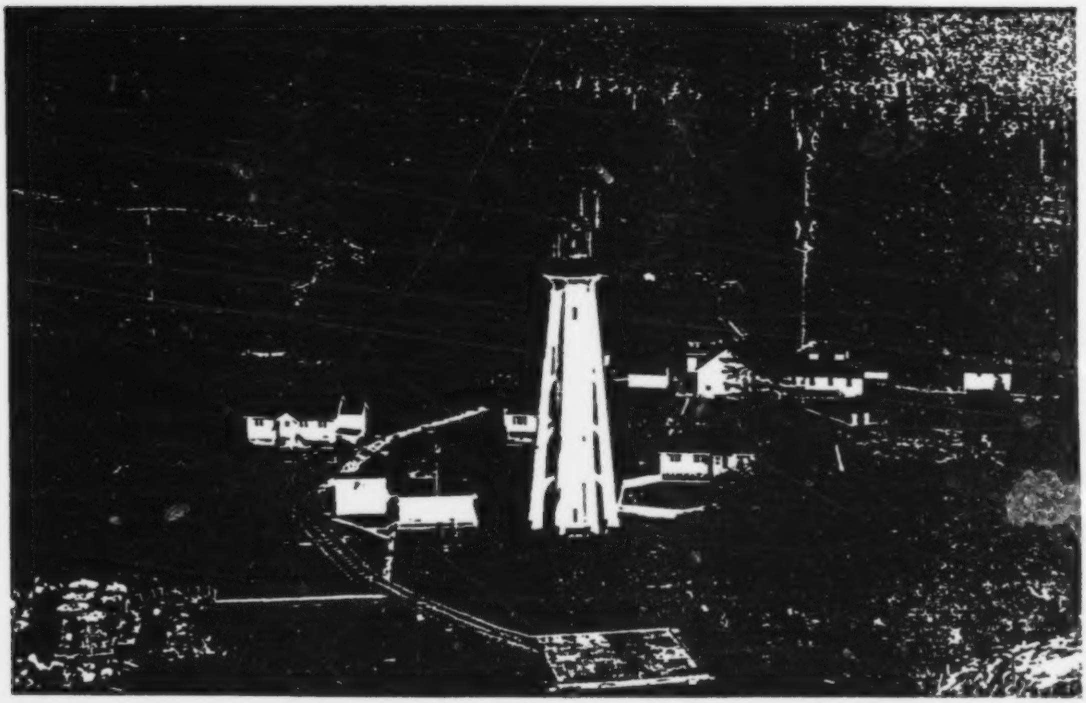
MAKE AND MODEL	STAMFORD C30B
SERIAL NO.	31059/1
T.NO.	
VOLTAGE	120/240
AMPS	266 A
KW	49 KW
RPM	1800RPM
PHASE	1
REGULATOR	MARK 2A
BEARING	
BATTERY CHARGER#1	SAB NIFE SCB 102-12-10
SERIAL NO.	103836
T.NO.	T11639
VOLTS IN	120VAC
VOLTS OUT	12 VDC
AMPS OUT	10 ADC
BATTERIES	1-DELCO 301A 3/89

GENERATOR # 2

MAKE AND MODEL	STAMFORD C30B
SERIAL NO.	32441/1
T. NO.	
VOLTAGE	120/240
AMPS	240 A
KW	44 KW
RPM	1800RPM
PHASE	1
REGULATOR	MARK 2A
BEARING	
BATTERY CHARGER#2	SAB NIFE SCB 102-12-10
SERIAL NO.	103830
T.NO.	T116401
VOLTS IN	120VAC
VOLTS OUT	12 VDC
AMPS OUT	10 ADC
BATTERIES	1-DELCO 317 6/89



ESTEVAN - LIGHT STATION



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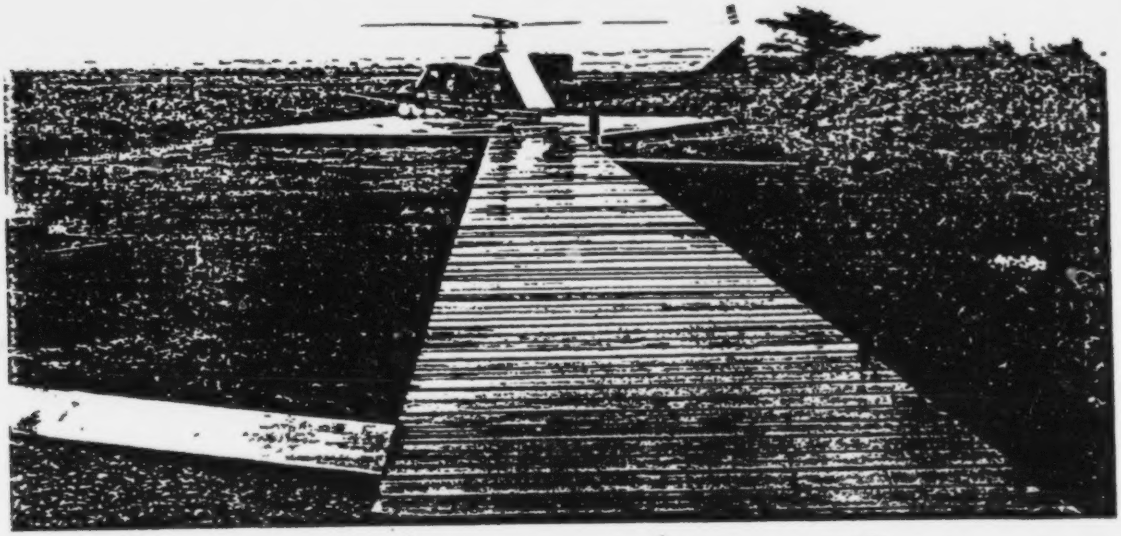


WALKWAY TO HELICOPTER PAD.

LIGHT TOWER

LENNARD ISLAND LIGHTSTATION

LL - 134

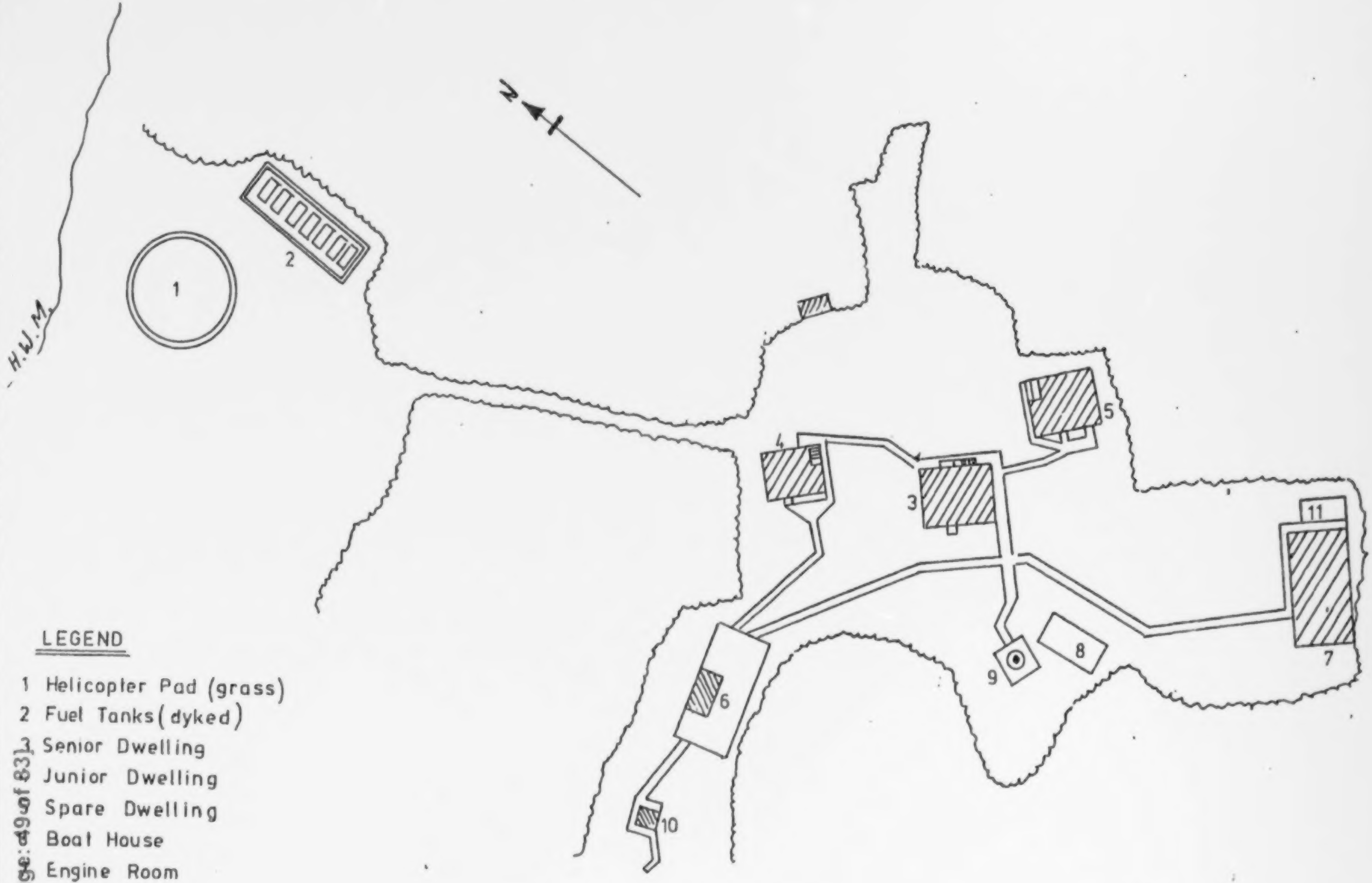
Lennard Island Lightstation is situated on a wooded island one and a half miles from Cox Point, and approximately 5 miles west of Tofino. Lennard Island is one of a group of islands, being the largest and most westerly of this group.

The station was established in 1904, and in 1906 to aid navigation, a fog horn was added. The light, which is on top of a 16.9 metre concrete tower (constructed in 1987), is extensively used by merchant ships, commercial and sports fishermen, and pleasure boats during the summer months.

The station consists of an engine room, housing the diesel generators, compressors and relevant equipment. An adjacent room houses the large air receivers and the type of 'F' Diaphone Fog Horn. A further two large rooms being the station workshop, and a radio room housing a radio beacon. There are three dwellings, but only two being used for lightkeepers, the third dwelling being a spare for work crews etc. There is also an aerial hoist at the station for landing materials and supplies. The helicopter pad is a level grassy area, north of the main dwellings.

Electric power is generated by two 20 KW Generator Sets, and along with appropriate modernization equipment, were installed in the renovated Engine Room in March 1979.

Book compiled July 1991



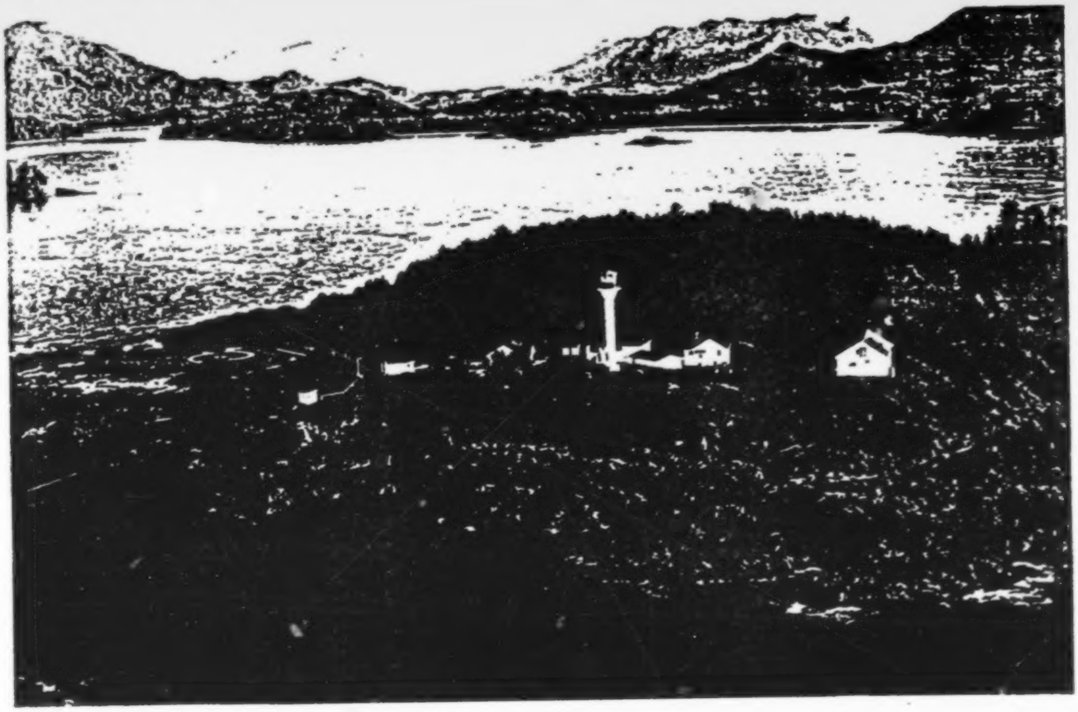
LEGEND

1 Helicopter Pad (grass)
2 Fuel Tanks (dyked)
3 Senior Dwelling
4 Junior Dwelling
5 Spare Dwelling
6 Boat House
7 Engine Room
8 Cistern
9 Light tower
10 Winch house
11 Drop off pad

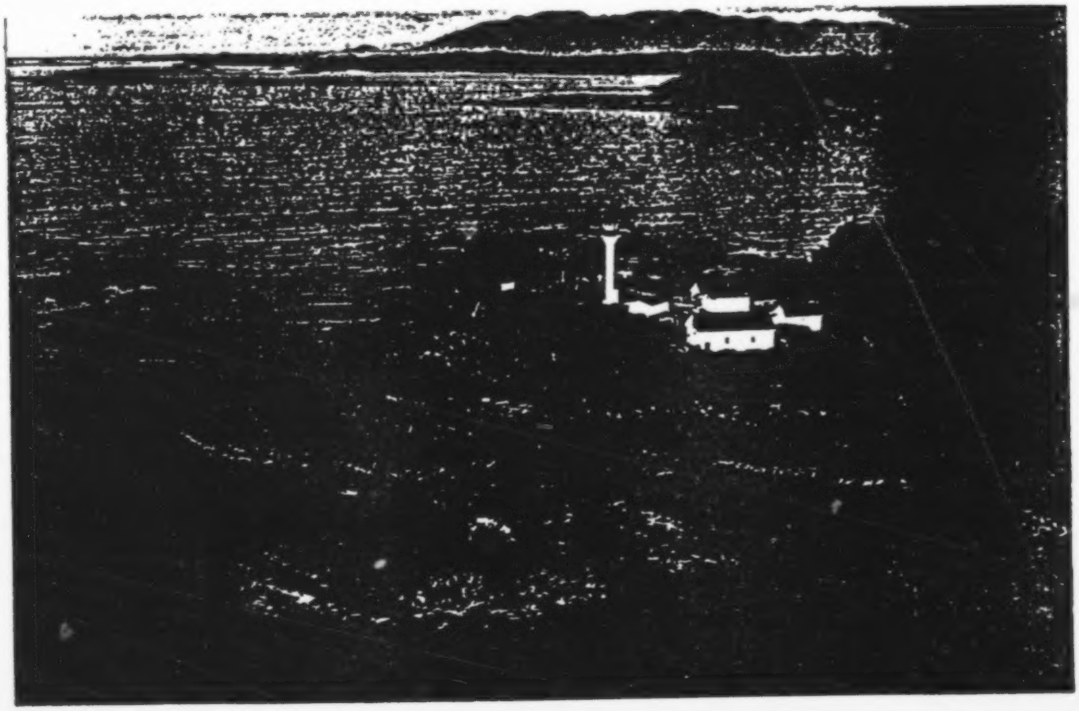
SITE PLAN – LENNARD ISLAND

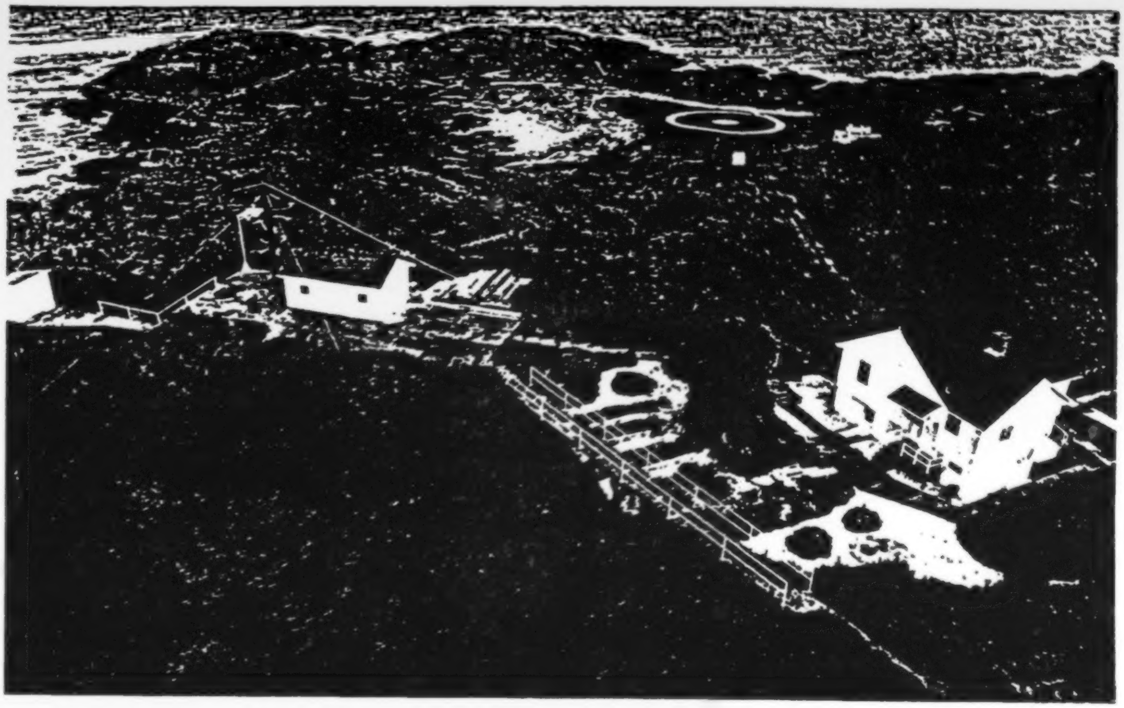
EQUIPMENT	ENGINE CONTROL PANEL
MAKE AND MODEL	CUMMINS
VOLTAGE	120/240
KW	20 KW
SERIAL NO.	DIA. EL5720B/EL5721B
T.NO.	
PHASE	1

EQUIPMENT	GENERATORS
GENERATOR # 1	
MAKE AND MODEL	STAMFORD C20B
SERIAL NO.	D1881/4
T.NO.	T134081
VOLTAGE	120/240
AMPS	104A
KW	20 KW
RPM	1800 RPM
PHASE	1
REGULATOR	MARK 2A
BEARING	
BATTERY CHARGER#1	VAOPR 70-4-172
SERIAL NO.	7110136/E
T.NO.	
VOLTS IN	120 VAC
VOLTS OUT	13.6 VDC
AMPS OUT	8A
BATTERIES	DELCO 1150 6/89
GENERATOR # 2	
MAKE AND MODEL	STAMFORD AC234B
SERIAL NO.	F1439/2
T. NO.	134079
VOLTAGE	120/240
AMPS	104A
KW	20 KW
RPM	1800 RPM
PHASE	1
REGULATOR	INTERNAL NUPART SX440
BEARING	
BATTERY CHARGER#2	VAPOR 70-4-172
SERIAL NO.	7110155/E
T.NO.	
VOLTS IN	120 VAC
VOLTS OUT	13.6 VDC
AMPS OUT	8A
BATTERIES	DELCO 1150 10/89



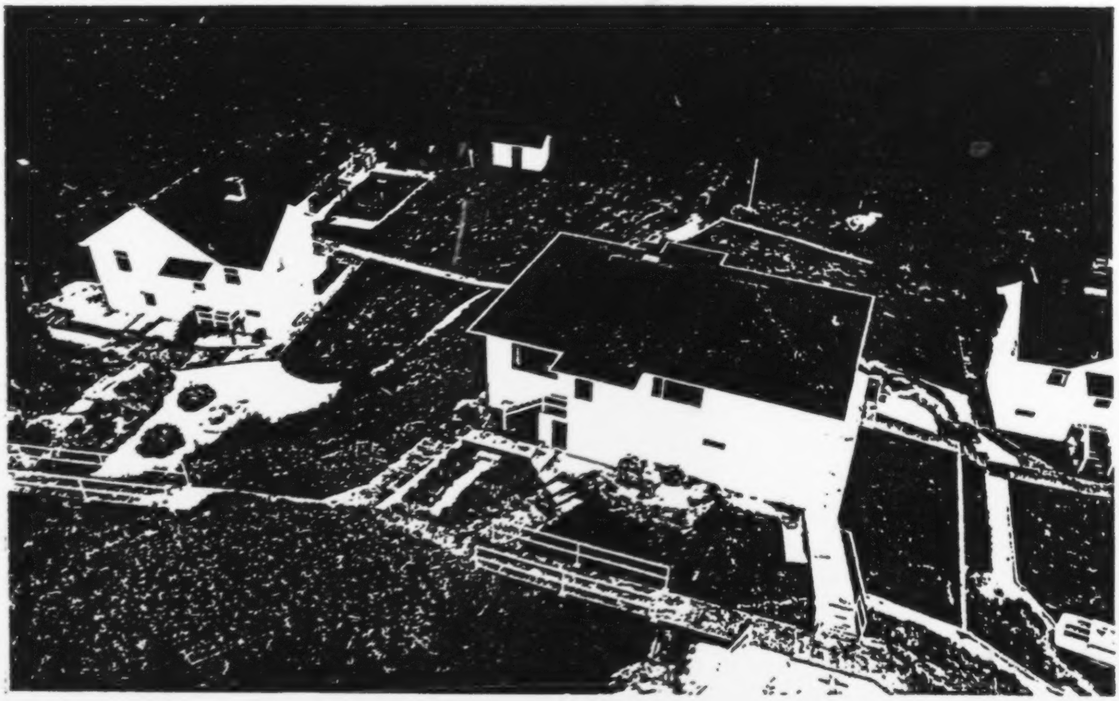
LENNARD ISLAND LIGHTSTATION.

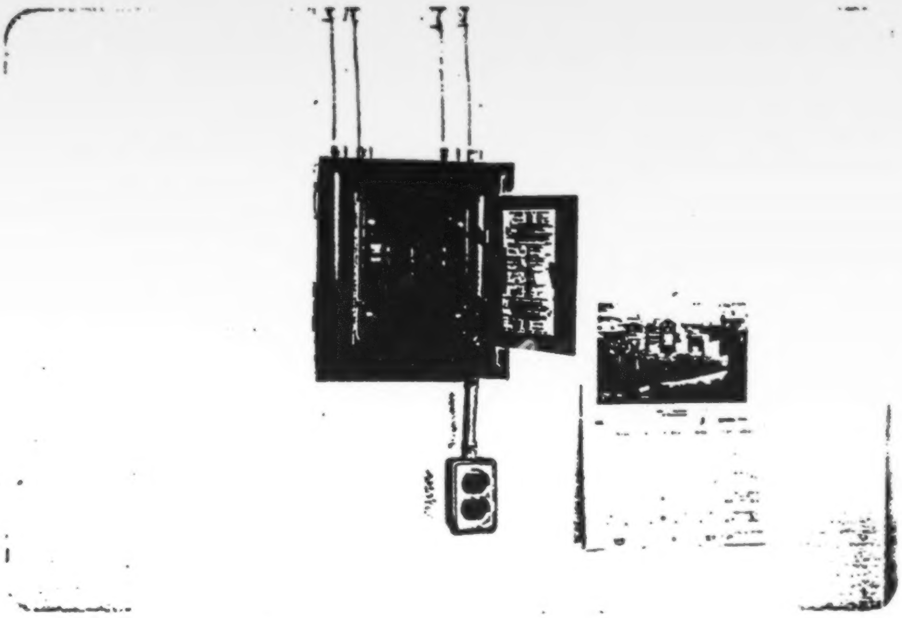




LIGHTSTATION.

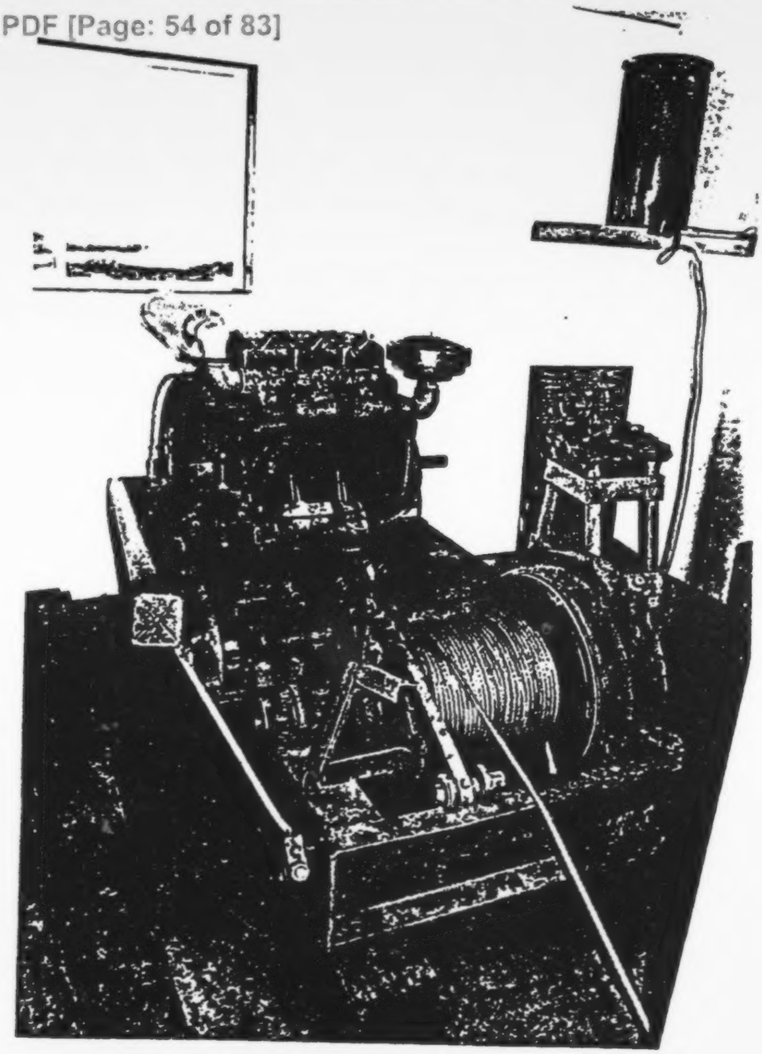
VIEWED FROM LIGHT TOWER.





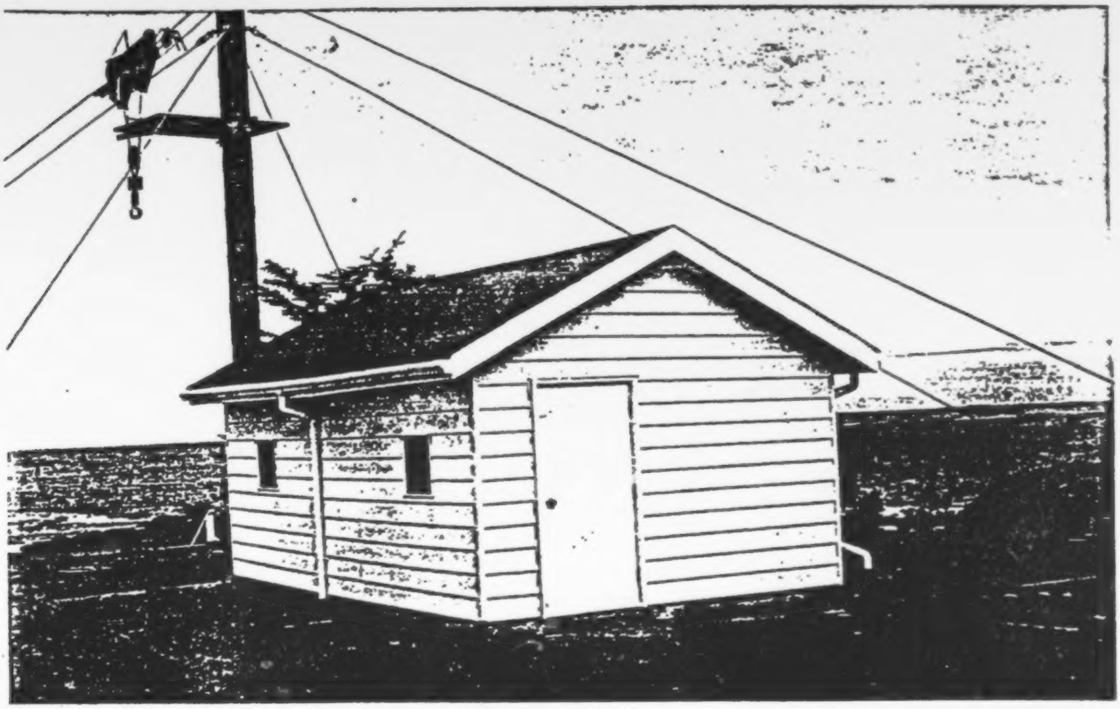
WORKSHOP DISTRIBUTION.

RADIO ROOM.

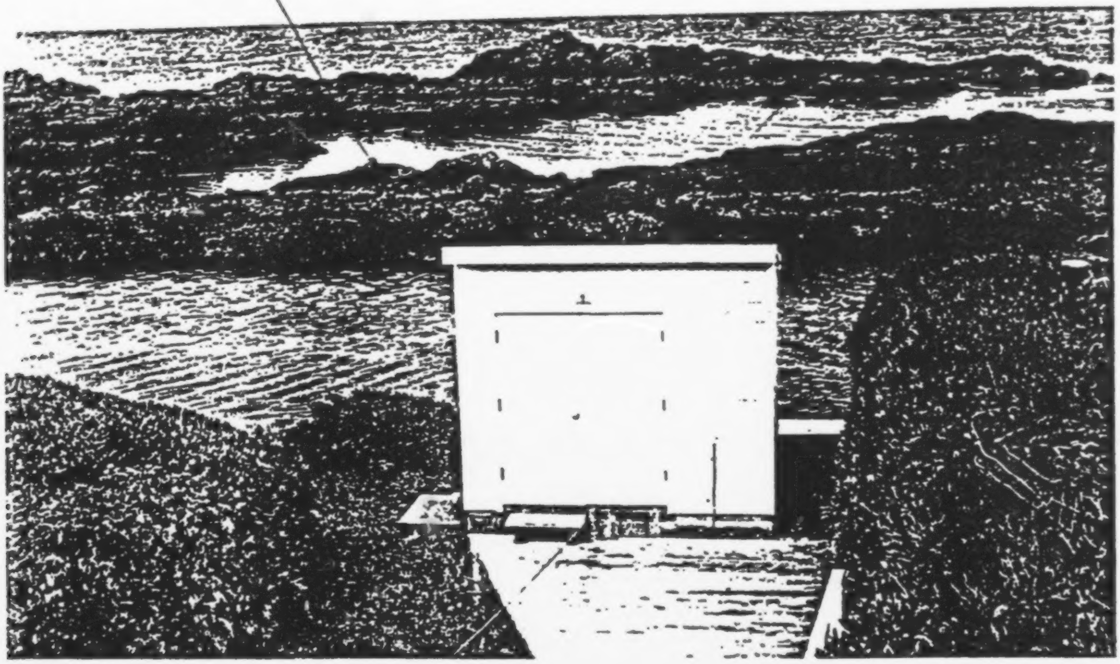


AERIAL WINCH.

GRASS AREA - HELICOPTER PAD



AERIAL MAST & BOAT SHED.



AERIAL - WINCH HOUSE

AMPHITRITE POINT LIGHTSTATION

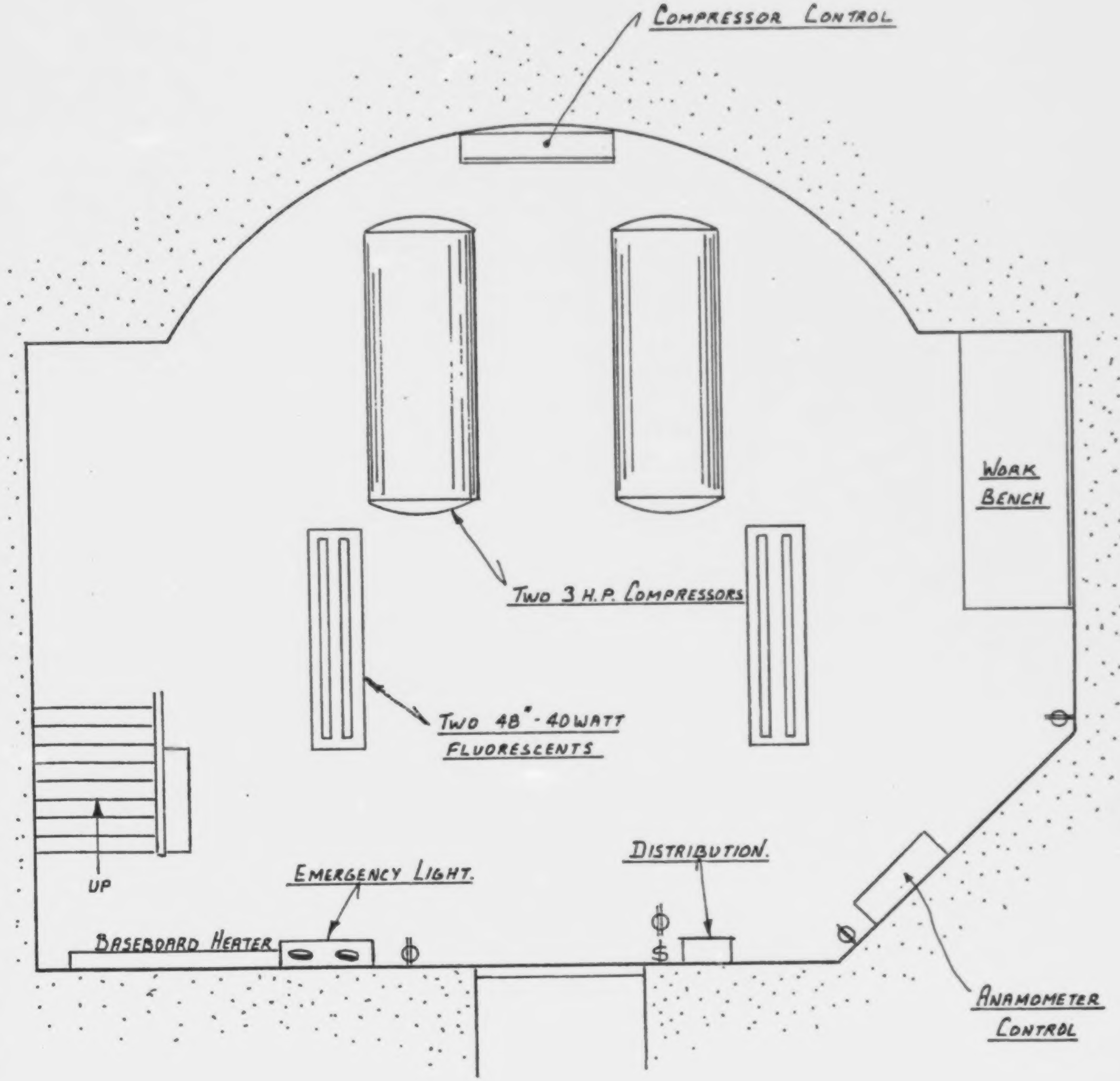
LL - 135

Amphitrite Point is at the southern extremity of the Ucluth Peninsula at the northern entrance to Barkley Sound and Ucluelet Inlet. The station was established in 1906 to guide ships bound for Barkley Sound, Ucluelet Inlet, Bamfield and Port Alberni. This station is accessible by road through Ucluelet, also there is a concrete helicopter pad located in front of the V.T.M.S. Building adjacent to the Station.

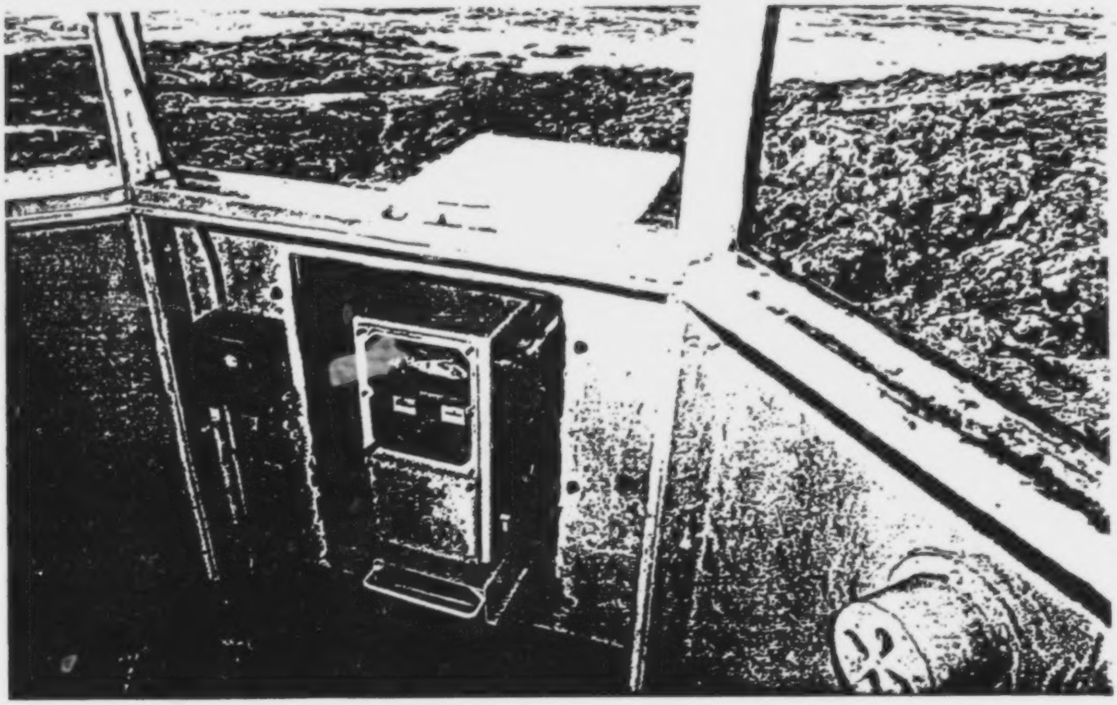
The fog signal was established in 1927 and has been maintained since that time and was updated in 1963 to an Airchime KM110/85 air horn. The fog signal and light are housed in a concrete building with a lantern on top putting the light 58 feet above high water.

Electric power is supplied via reliable hydro power from Ucluelet by poleline and is backed up by an automatic standby generator which also supplies the V.T.M.S. Building. Initial modernization consisted of updating existing equipment at the station, replacing Fog horn compressors, relocating the Fog detector to the Keepers house along with the event recorder.

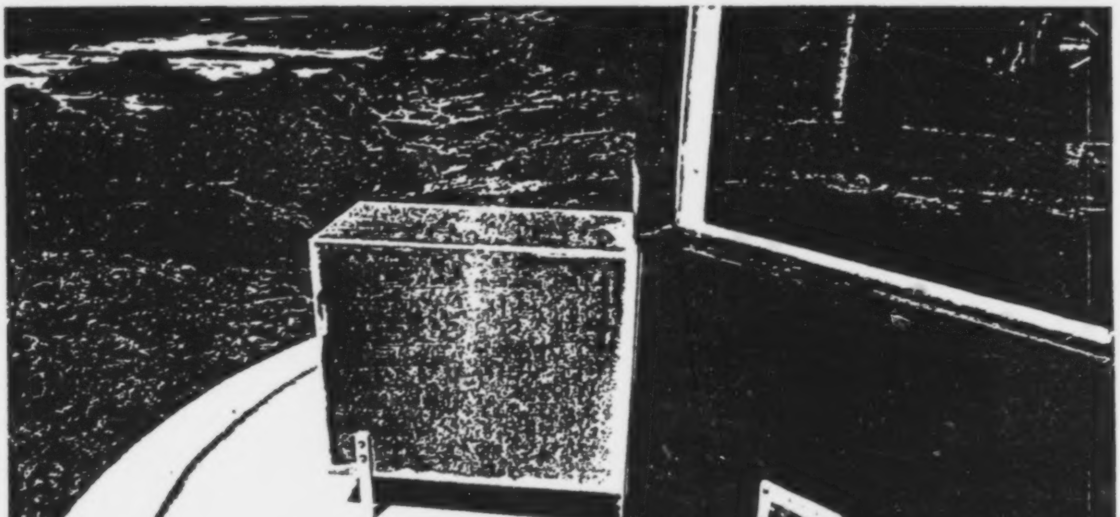
The station was un-manned in 1988, the lightkeeper's dwelling was turned over to V.T.M.S. and the fog detector was relocated to a housing positioned on the lantern house. In-trac equipment was located in the light tower.



LIGHT TOWER
COMPRSSOR ROOM
(GROUND FLOOR)



Videograph Fog Detector



Exterior View of Videograph Housing

CAPE BEALE LIGHTSTATION

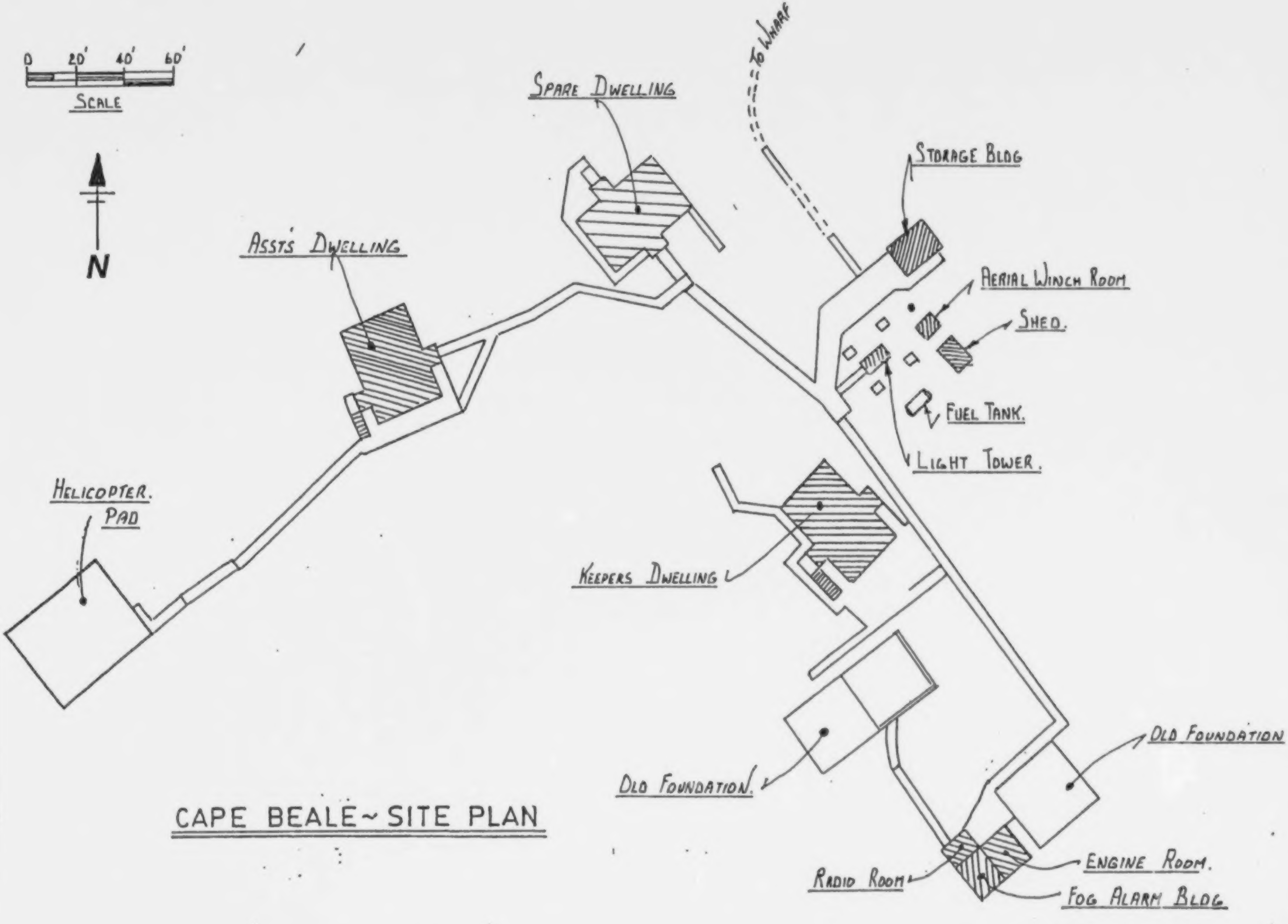
LL - 176

Originally called Punta de Alegria, but renamed by Captain Barkley in 1781 in memory of John Beale, second mate of the ship "Imperial Eagle", Beale along with an entire boat's crew were killed earlier that year in a skirmish with Indians. The building of a lighthouse at this site in 1874, was stated as the most trying project yet undertaken by the department in B.C. All equipment, including seven tons of lantern and machinery was carried on Indian backs through a tangled rain forest from Dodger Cove, six miles away. Cape Beale was selected as the guiding light for Barkley Sound.

The station presently consists of a concrete block engine room housing two 25KW Diesel generators supplying power to the station. An adjacent room houses the station's radio equipment. The fog alarm room was built on top of the engine room and houses two compressors, and three sets of KM.85/II0 Airchime fog horns. There are 3 dwellings on the station but only 2 lightkeepers, the spare dwelling being used for work crews. There is a timber helicopter pad adjacent to the assistant keeper's dwelling, this being a replacement pad built in 1991. Landing by boat at this station is made at a concrete wharf situated on the other side of the Cape, approximately 650 feet North/West of the station. Supplies are delivered from the wharf to the main station by aerial.

Traffic passing the station is primarily commercial, both deep sea and coastal, including all deep sea traffic entering the sound for the Port of Alberni. Heavy concentrations of fishing vessels use the waters adjacent to the lightstation throughout the year.

Book Compiled July 1991



CAPE BEALE ~ SITE PLAN

FACILITY	CAPE BEALE	L.L.#	176
KEEPER	NORBE BRAND	COST CODE	8025
PHONE #	TOFINO RADIO PATCH 726-7716		
SYSTEM	ENGINE ROOM		

EQUIPMENT		DIESEL ENGINE 'A'
	IDENTIFICATION#	T134047
	TYPE	LISTER HR4
	SERIAL#	902HR4A27
	H.P.	50
	RPM	1800
	BELT SIZE	A58
	SOLENOID TYPE	VARLEY
	LIFT PUMP?	YES
	OIL PRESS. IND.	MECH.OIL FILLED GAUGE
	MUFFLER	NONE
	OIL FILTER	CH336PL & MF43-A
	FUEL FILTER	C1191A

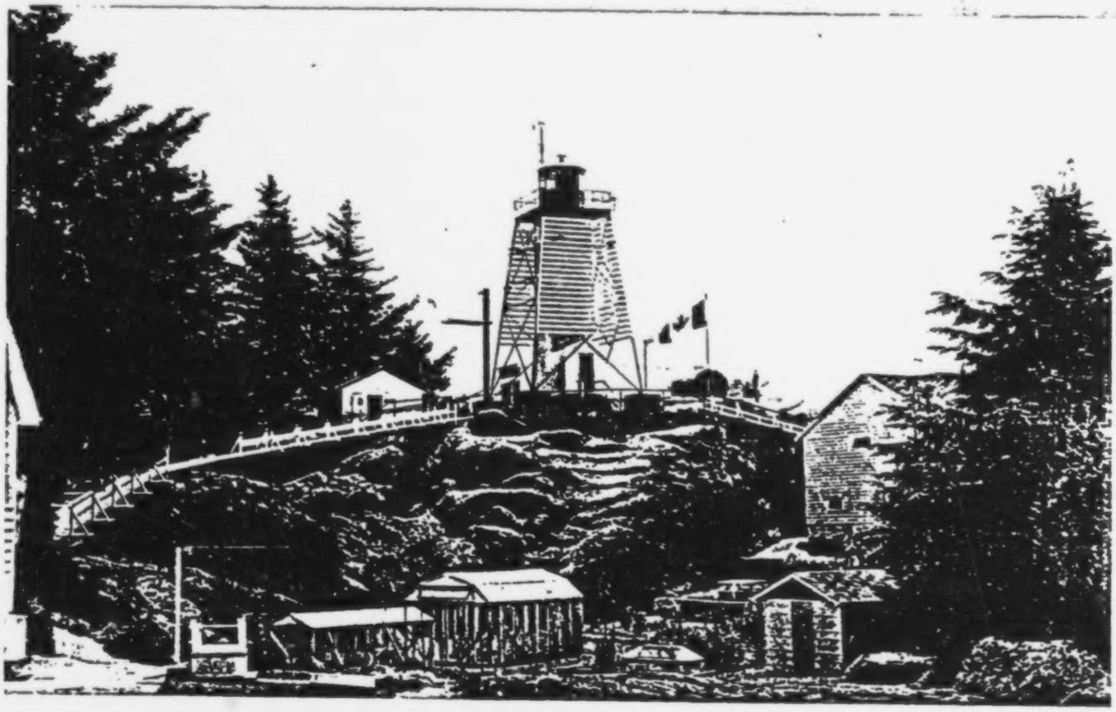
EQUIPMENT		GENERATOR
	IDENTIFICATION#	T134069
	TYPE	STAMFORD C234C
	SERIAL#	D 4240/1
	KVA	31.25

EQUIPMENT		DIESEL ENGINE 'B'
	IDENTIFICATION#	T134048
	TYPE	LISTER HR4
	SERIAL#	877HR4A27
	H.P.	50
	RPM	1800
	BELT SIZE	A58
	SOLENOID TYPE	SYNCHROSTART
	LIFT PUMP ?	NO
	OIL PRESS. IND.	MECH. OIL FILLED GAUGE
	MUFFLER	NO
	OIL FILTER	CH336PL & MF43-A
	FUEL FILTER	C1191A

EQUIPMENT		GENERATOR
	IDENTIFICATION#	T134068
	TYPE	STAMFORD C234C
	SERIAL#	D 4240/2
	KVA	31.25

EQUIPMENT	ENGINE CONTROL PANEL
MAKE AND MODEL	CUMMINS
VOLTAGE	120/240 VAC
KW	25 KW
SERIAL NO.	
T.NO.	
PHASE	1

EQUIPMENT	GENERATORS
GENERATOR # 1	
MAKE AND MODEL	STAMFORD C234C
SERIAL NO.	D2647/7
T.NO.	T134074
VOLTAGE	120/240 VAC
AMPS	130 A
KW	25 KW
RPM	1800 RPM
PHASE	1
REGULATOR	INTERNAL NUPART SX440
BEARING	
BATTERY CHARGER#1	VAPOR
SERIAL NO.	7110150-E
T.NO.	
VOLTS IN	120 VAC
VOLTS OUT	13.6 VDC
AMPS OUT	8:00 AM
BATTERIES	D8
GENERATOR # 2	
MAKE AND MODEL	STAMFORD C234C
SERIAL NO.	D4240/2
T. NO.	T134068
VOLTAGE	120/240 VAC
AMPS	130 A
KW	25 KW
RPM	1800 RPM
PHASE	1
REGULATOR	INTERNAL NUPART SX440
BEARING	
BATTERY CHARGER#2	VAPOR
SERIAL NO.	7110137-E
T.NO.	
VOLTS IN	120 VAC
VOLTS OUT	13.6 VDC
AMPS OUT	8:00 AM
BATTERIES	D8



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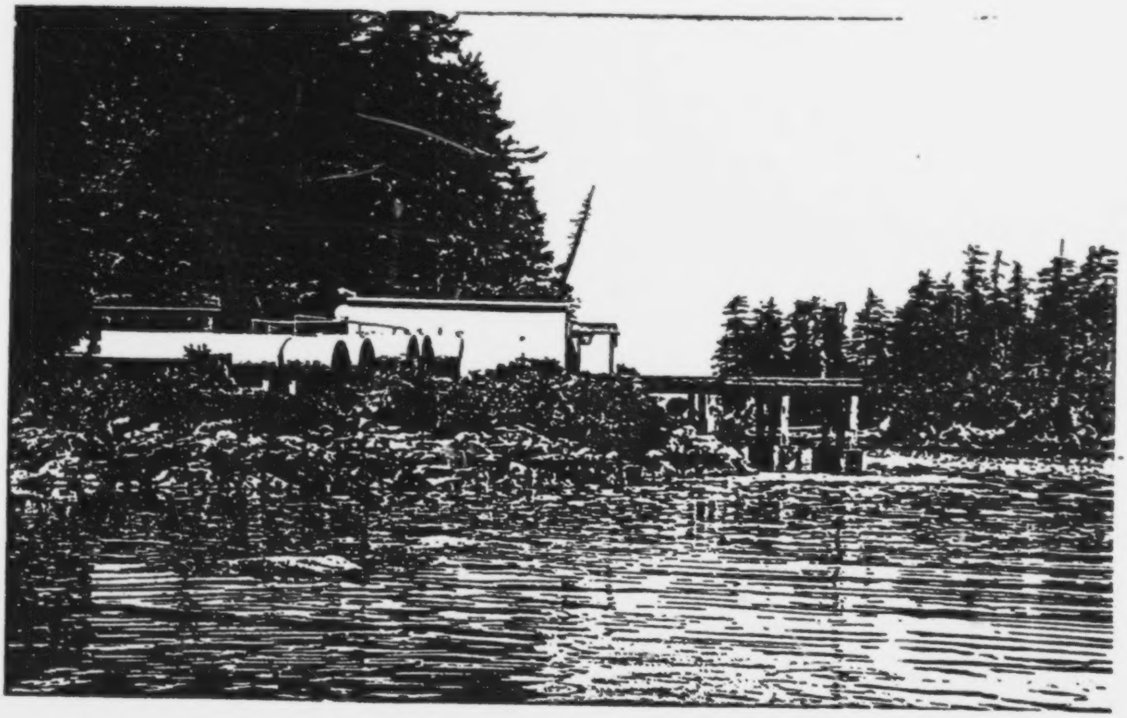
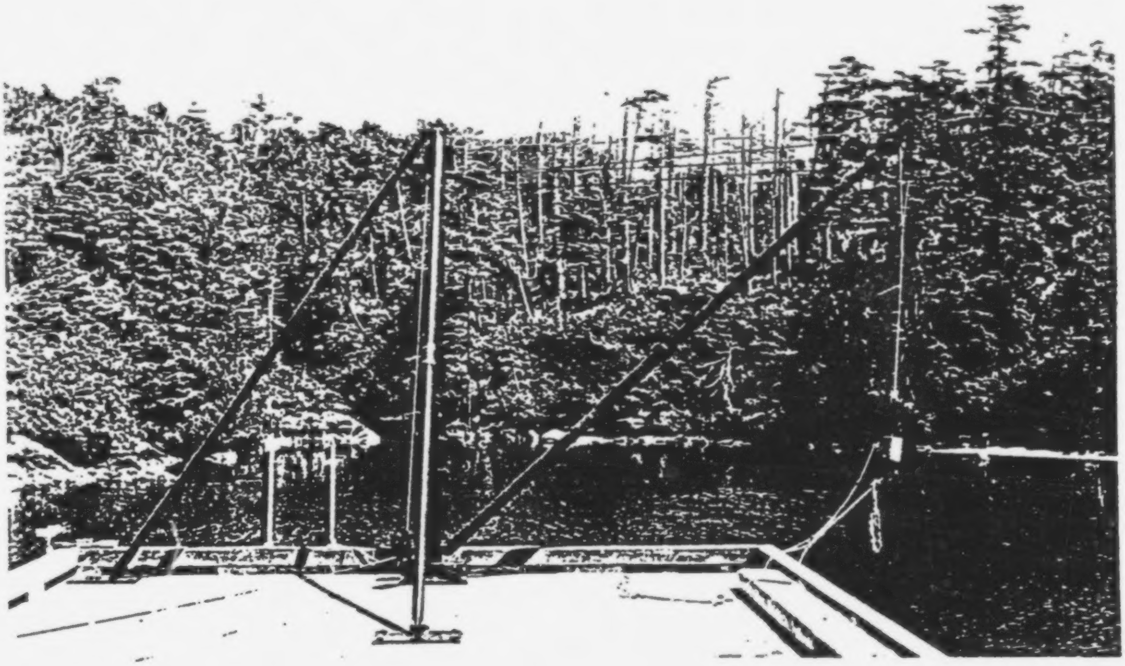
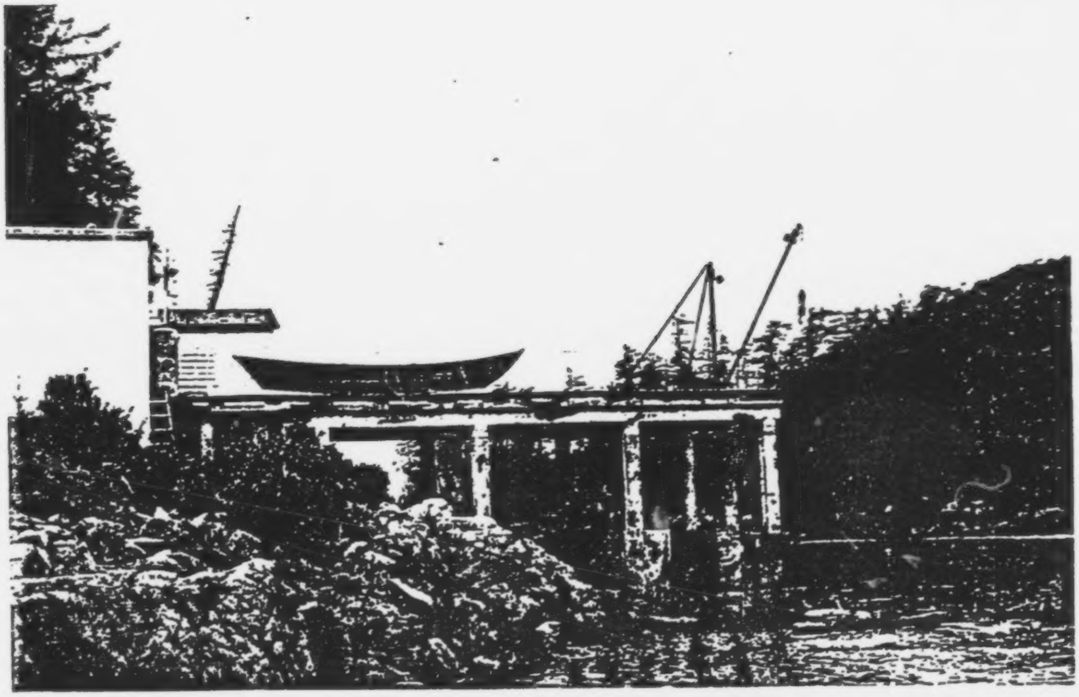




WHARF DERRICK.



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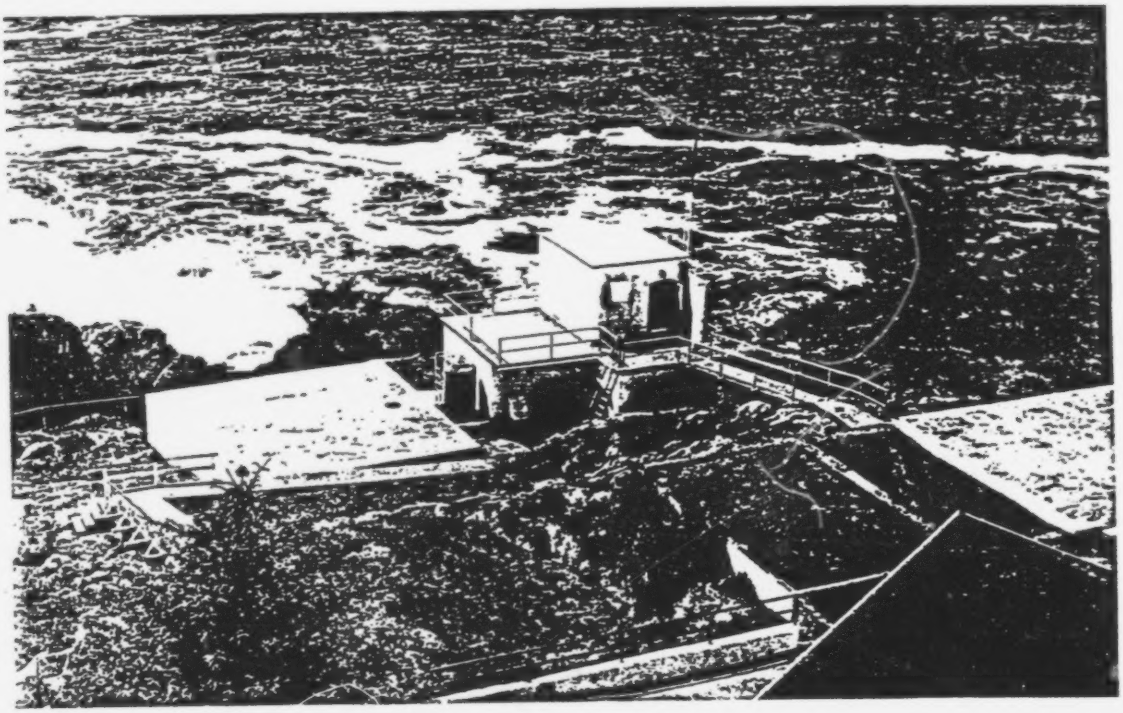
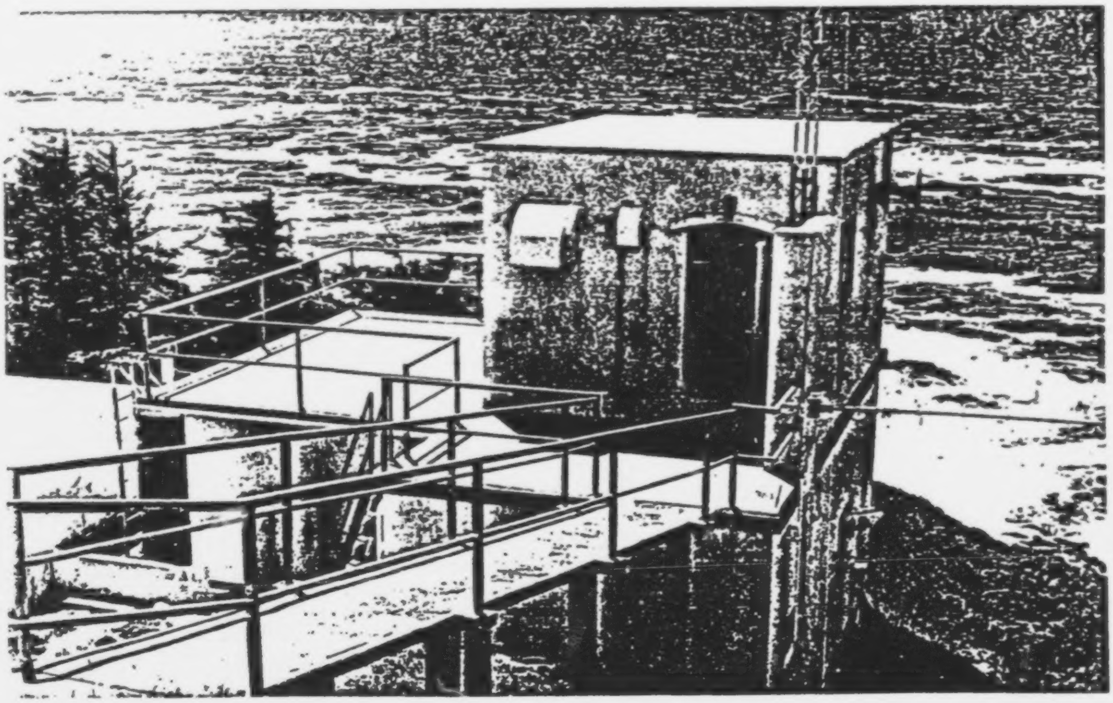


ENGINE . COMPRESSOR & RADIO BUILDING



PACHENA POINT LIGHTSTATION

LL 178

Pachena Point Lightstation is located on the West Coast of Vancouver island, approximately 90 miles from Victoria. The station was built on a precarious cliff in 1907, and formed part of the "West Coast" life saving trail at that time.

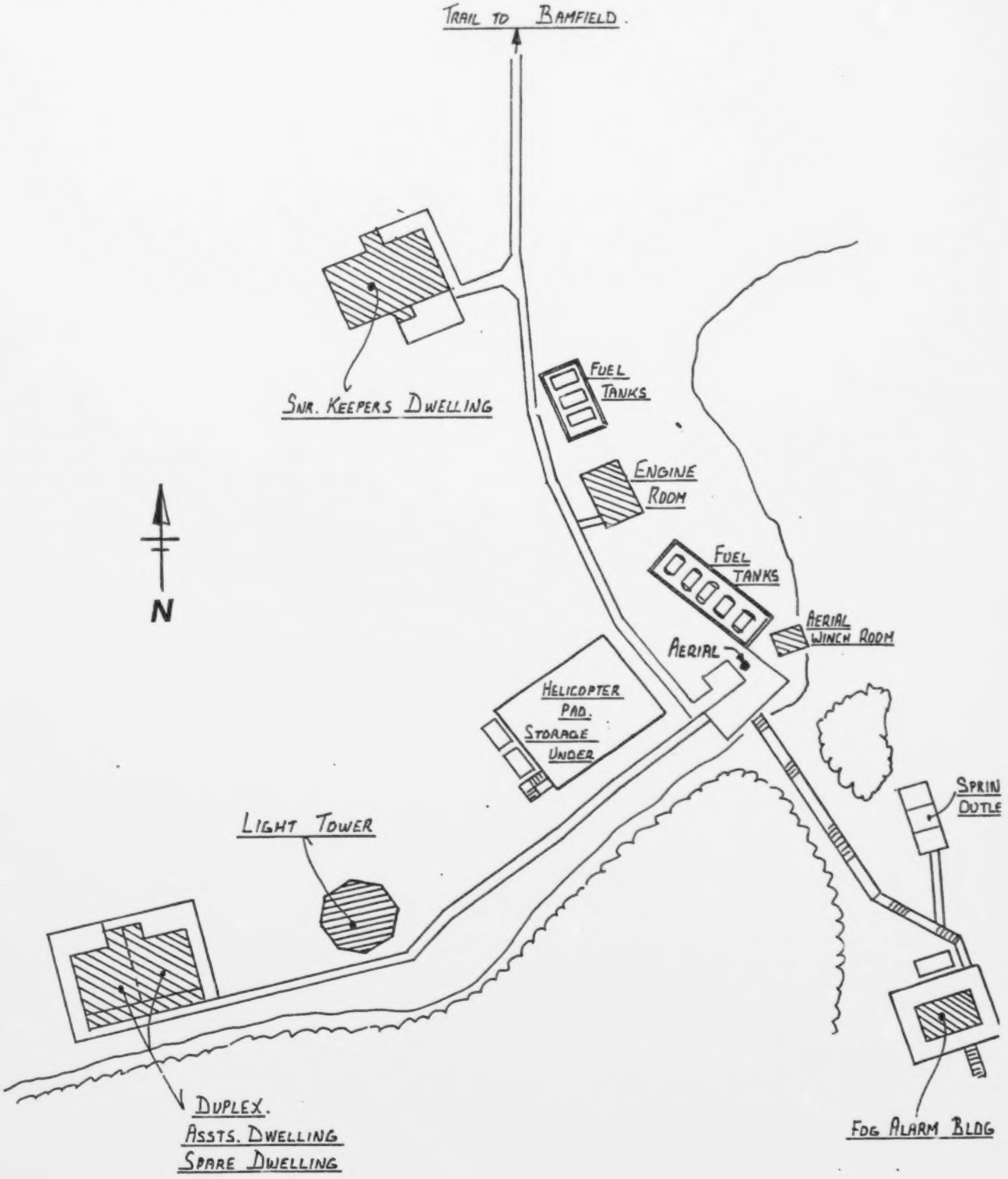
The station consists of an engine room, housing the diesel generators, which gives all power requirements to the station. The fog alarm equipment is housed in a block building at a lower level on the cliff, and is reached by a steep stairway. There are three dwellings on the station, but only two light keepers. A spare dwelling which is part of a duplex dwelling, is used by work crews on the station. A concrete helicopter pad replaced a wooden pad in 1983 and the underside now includes storage space, workshop and the station radio room. There is also an aerial hoist at the station for landing materials and supplies.

This light is one of the guiding beacons which marks the Eastern side of the entrance to the Juan de Fuca Strait.

Traffic passing the station is primarily commercial, both deep sea and coastal, including all deep sea traffic entering and leaving the major ports of Puget Sound and the Strait of Georgia.

As the station still forms part of the "West Coast" Trail, now mainly used for hiking, the station sees many visitors over the years.

BOOK COMPILED JULY 1991



PACHENA PT.~ SITE PLAN

EQUIPMENT	ENGINE CONTROL PANEL
MAKE AND MODEL	CUMMINS
VOLTAGE	120/240 VAC
KW	25 KW
SERIAL NO.	
T.NO.	
PHASE	1

EQUIPMENT	GENERATORS

GENERATOR # 1

MAKE AND MODEL	STAMFORD
SERIAL NO.	D2C47/6
T.NO.	T134062
VOLTAGE	120/240 VAC
AMPS	130 A
KW	25 KW
RPM	1800 RPM
PHASE	1
REGULATOR	INTERNAL NUPART SX440
BEARING	2 BEARING

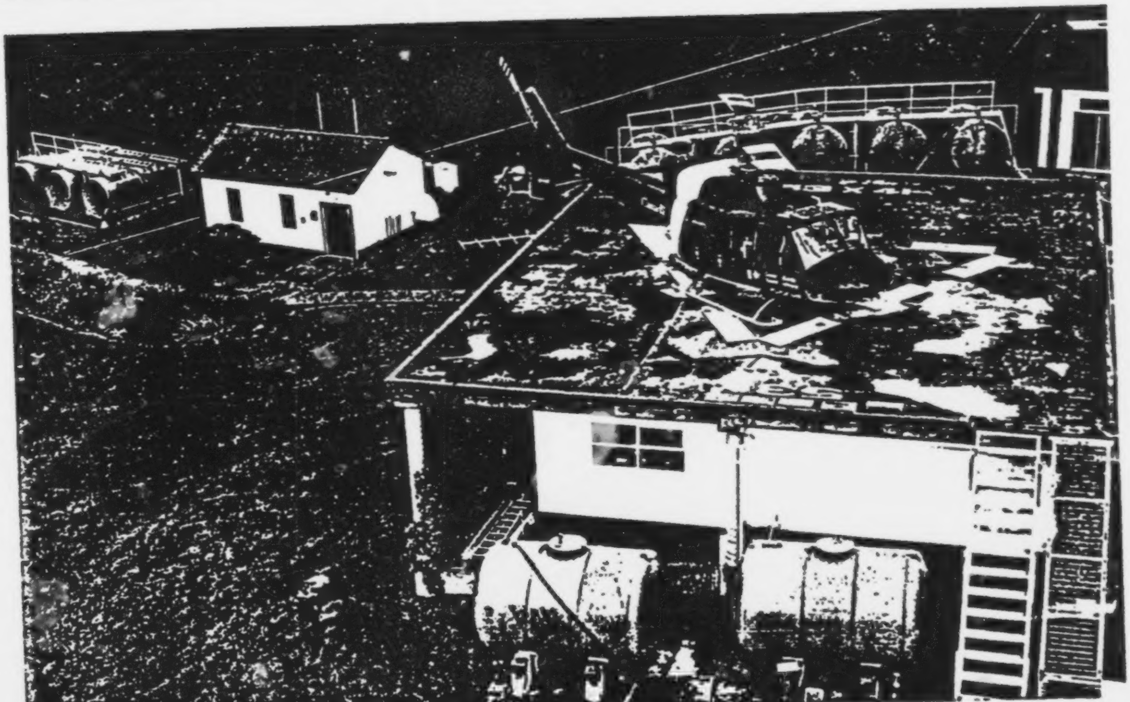
BATTERY CHARGER#1	VAPOR
SERIAL NO.	
T.NO.	
VOLTS IN	120 VAC
VOLTS OUT	13.6 VDC
AMPS OUT	8 ADC
BATTERIES	D8

GENERATOR # 2

MAKE AND MODEL	STAMFORD
SERIAL NO.	D2C47/14
T. NO.	T134065
VOLTAGE	120/240 VAC
AMPS	130 A
KW	25 KW
RPM	1800 RPM
PHASE	1
REGULATOR	INTERNAL NUPART SX440
BEARING	2 BEARING

BATTERY CHARGER#2	VAPOR
SERIAL NO.	71030150-E
T.NO.	T-134305
VOLTS IN	120 VAC
VOLTS OUT	13.6 VDC
AMPS OUT	8 ADC
BATTERIES	D8

EMERGENCY LIGHT (FA.250)



HELICOPTER PAD - VIEWED FROM LIGHT TOWER.

CARMANAH POINT LIGHTSTATION

LL - 180

Carmanah Point Lightstation is located on the west coast of Vancouver Island, approximately 70 miles from Victoria. The light was established in 1891.

The station presently consists of an engine room, housing the diesel generators, compressors, and two sets of KM 85/110 Airchime horns. Two adjacent rooms house the radio beacon and seperate workshop. There are three dwellings, but only two keepers; the spare being used for work crews on the station. There is a timber helicopter pad adjacent to the spare dwelling. There is also an aerial hoist at the station for landing materials and supplies.

This light is the guiding beacon which marks the eastern side of the entrance to Juan de Fuca Strait.

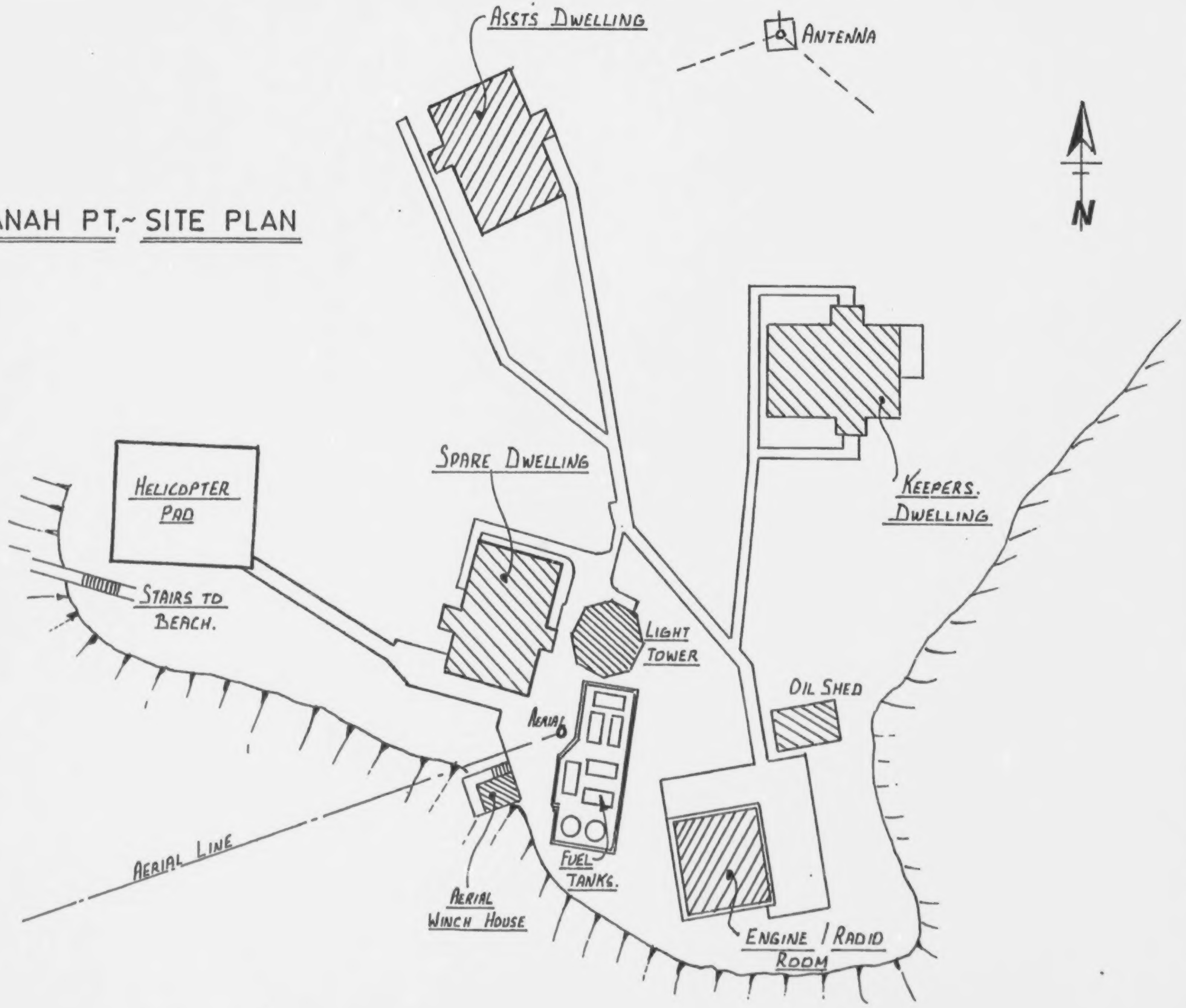
Traffic passing the station is primarily commercial, both deep sea and coastal, including all deep sea traffic entering and leaving the major ports of Puget Sound and the Strait of Georgia. Some of this traffic includes super tankers bound for Cherry Point Refinery.

Heavy concentrations of fishing vessels use the waters adjacent to the lightstation throughout the year.

The entrance to Nitinat Lake is to the west of the lightstation and log towing between Nitinat Bar and Sooke Harbour, passing the light, is common.

Electric power is generated by two 25 KW diesel generators, and modernization equipment was installed in the new concrete block engine/radio room in December 1978.

CARMANAH PT.~ SITE PLAN



EQUIPMENT	ENGINE CONTROL PANEL
MAKE AND MODEL	MECHRON CPF/DPPEC
VOLTAGE	120/240 VAC
KW	20 KW
SERIAL NO.	
T.NO.	
PHASE	1 PH

EQUIPMENT	GENERATORS

GENERATOR # 1

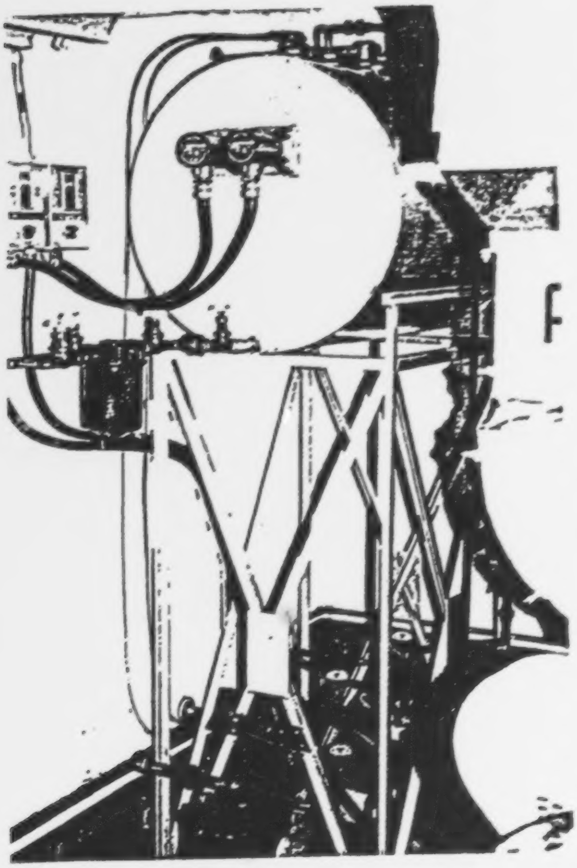
MAKE AND MODEL	STAMFORD C234 C	
SERIAL NO.	D2647/13	
T.NO.	T 134067	
VOLTAGE	120/240	
AMPS	130A	DERATED
KW	25 KW	DERATED
RPM	1800RPM	
PHASE	1 PH	
REGULATOR	INTERNAL NUPART SX440	
BEARING		

BATTERY CHARGER#1	SABNIFE SCB-102-12-10
SERIAL NO.	
T.NO.	
VOLTS IN	120 VAC
VOLTS OUT	12 VDC
AMPS OUT	10 AMPS
BATTERIES	DELCO 1150

GENERATOR # 2

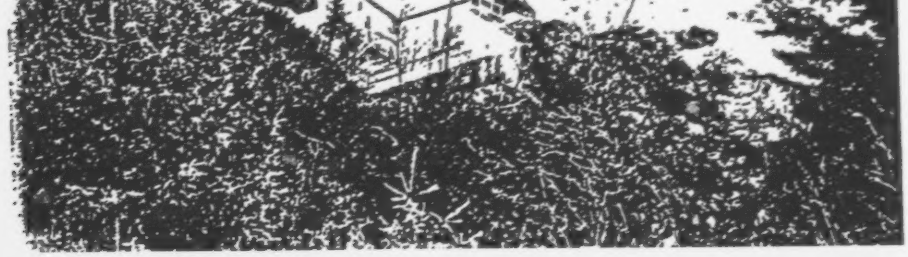
MAKE AND MODEL	STAMFORD HC 244 A1	
SERIAL NO.	W9029/1	
T. NO.		
VOLTAGE	120/240	
AMPS	130A	DERATED
KW	25 KW	DERATED
RPM	1800RPM	
PHASE	1 PH	
REGULATOR	INTERNAL NUPART SX440	
BEARING		

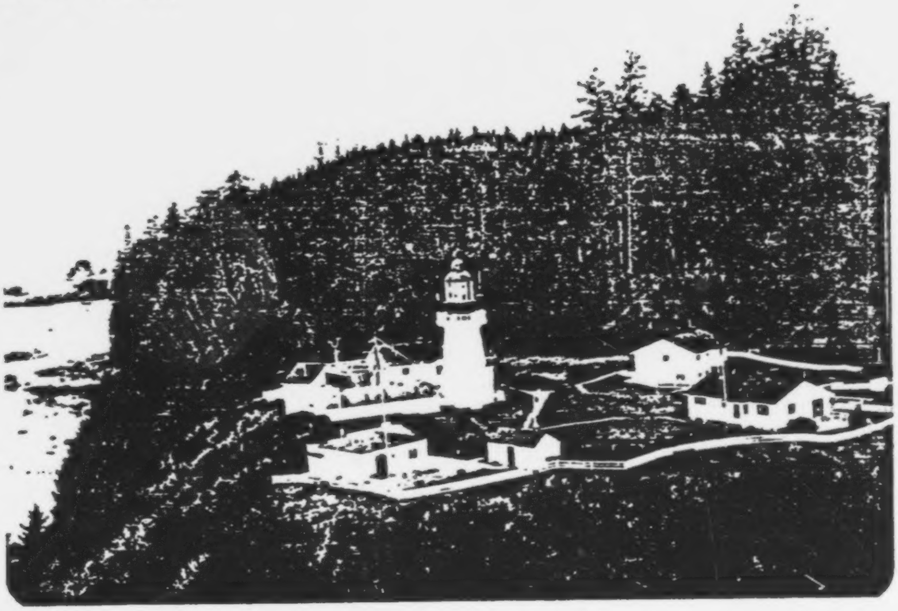
BATTERY CHARGER#2	SABNIFE SCB-102-12-10
SERIAL NO.	
T.NO.	
VOLTS IN	120 VAC
VOLTS OUT	13.6 VDC
AMPS OUT	10 AMPS
BATTERIES	DELCO 1150



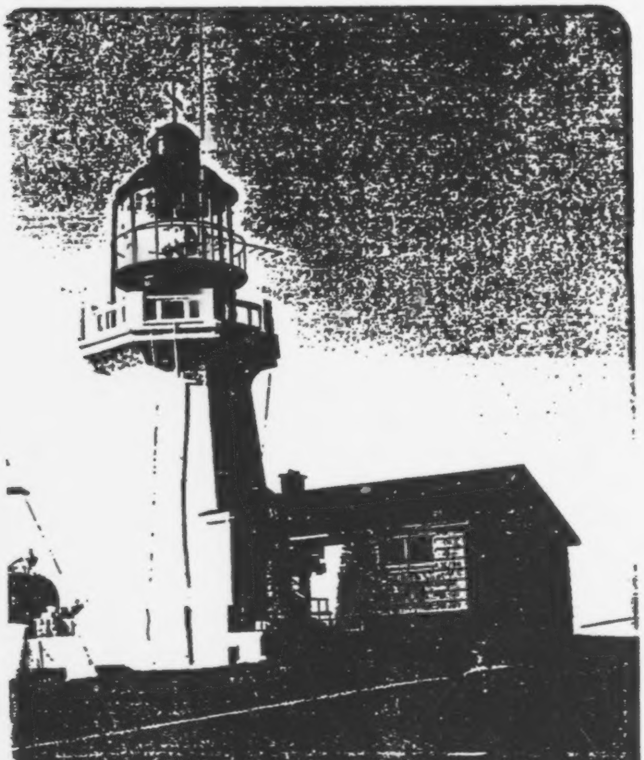
NGINE ROOM - DAY TANK.

ACCESS STAIRWAY
TO FOG ALARM BUILDING





LIGHTSTATION



LIGHT TOWER c SPARE HOUSE

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Considerations for Optimal Siting of Receiving Arrays off Canada's West Coast for ATOC

AUTHOR: Joseph A.Scrimger, Ian Schumacher, Roberto Racca, Donald Henderson.
JASCO Research Ltd., Sidney, BC Canada V8L 3S1

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(Two volumes includes Addendum)

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5cr There are concerns that due to the measured increase in greenhouse gases in the atmosphere a global warmin coupled with climate changes, is likely to occur. Warming of the oceans is possibly the most dire of these changes. It ma be possible, with appropriate technology, to measure warming trends in the world's oceans by transmitting sound puls across ocean basins and measuring their travel times, since sound travels faster in warm water than in cold. The Hea Island Feasibility Test (HIFT) was carried out in 1991 when sound pulses were transmitted around the world from transducer suspended below a ship, the *RV Cory Chouest* stationed to the north of Heard Island in the southern India Ocean. Canada recorded these transmissions on towed arrays deployed off the east and west coasts of N. America by *CFA Quest* and *CNAV Endeavour*. Resulting from an unsolicited proposal, JASCO Research Ltd. was contracted to analyse th recorded data. The subsequent phase to HIFT was the project ATOC (Acoustic Thermometry for Ocean Climate) whic called for the transmission of sound pulses across the N.Pacific Ocean basin from a transmitter near the Island of Kauai to receiver near Pt. Sur, N.California. As part of the contract it was decided to be worthwhile to consider the implications installing a second receiver off the west coast of Canada. Accordingly the bathymetry along paths between Kauai and th Canadian west coast was determined as a basis for sound propagation studies, the logistics of bringing data ashore from receiving array mounted at the 1000 m depth off the Canadian west coast to a Canadian Coast Guard station and the are distribution of fishing boats off the coast were examined. u

14. KEYWORDS, DESCRIPTORS or IDENTIFIERS (technically meaningful terms or short phrases that characterize a document and could be helpful in cataloguing the document. They should be selected so that no security classification is required. Identifiers, such as equipment model designation, trade name, military project code name, geographic location may also be included. If possible keywords should be selec from a published thesaurus. e.g. Thesaurus of Engineering and Scientific Terms (TEST) and that thesaurus-identified. If it is not possible t select indexing terms which are Unclassified, the classification of each should be indicated as with the title.)

Global Warming
Heard Island Feasibility Test
ATOC (Acoustic Thermometry for Ocean Climate)

#145132

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Contractor Report 94-63

Addendum to Considerations for Optimal Siting of Receiving Arrays off Canada's West Coast for ATOC (Acoustic Thermometry of Ocean Climate)

Prepared by

Joseph A. Scrimger, Roberto Racca, Ian Schumacher, Don Henderson
JASCO Research Ltd., Sidney, B.C.

Contract Serial Number W7708-2-0518/01-XSA

Scientific Authority

Garry J. Heard
Defence Research Establishment Pacific

April 1994

Addendum to "Considerations for Optimal Siting of Receiving Arrays off Canada's West Coast for ATOC"

Fish boat distribution off the Canadian West Coast.

In order to assess the acoustic interference likely to be generated by the Canadian West Coast salmon fishing fleet at any ATOC receiver situated off the Canadian West Coast, records of fish boat activity throughout a fishing season (April 1 to September 30, 1992) were compiled. This addendum constitutes such a compilation.

Acknowledgements

We wish to thank Bruce Cahusac, of J.C. Thomas and Associates, Vancouver, BC, for the data on fish boat distribution contained in the addendum to this report,

Permission to reproduce the data in the addendum was given by Neil Williscroft, F.T.A. Export Sampling Coordinator, Conservation and Protection Operations Branch, Fisheries & Oceans, Pacific Region, Vancouver, BC.

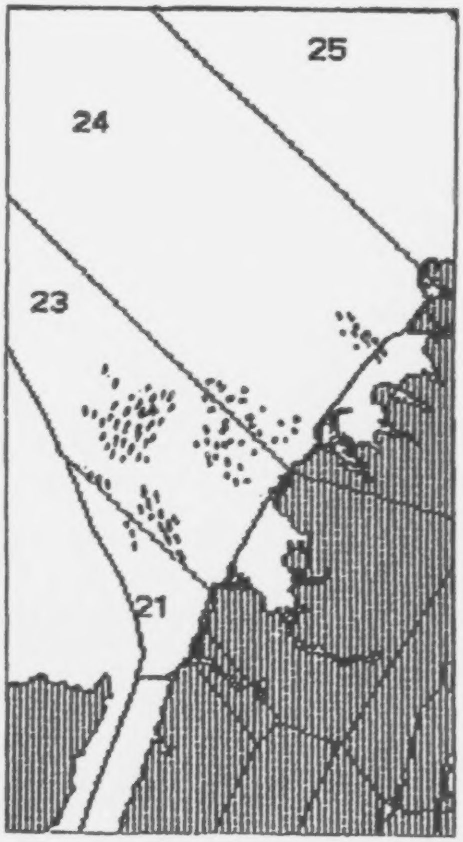
)

UCLUELET RADAR COUNTS

Observer: SHIRLEY BAIRD
Date: Day: 1 Month: APRIL 19: 92
Time: (24 hr clock): 800
Windspeed (knots/hr):
Amphitrite: calm Estevan: N 09

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	2
53	–
Total	2
Area 23	
Sub 55 (7 & 12 mile)	18
57 (20 mile)	72
58 (South Bank)	47
59 (Big Bank)	21
113 (Finger Bank)	–
Total	158
Area 24	
Sub 60 (La Perouse)	114
61	–
62 (Portland Pt)	44
63	–
64 (Estevan Pt)	7
65	–
	25
	25



Joe –
Please note that Area 21
= Stat. areas 121 & 21,
Area 23 = 123 & 23, and
Area 24 = 124 & 24.
- D.F.O. distinguishes areas inside or outside the surfline ... we do not.
BC.

'f.shore.

JOT 1991

1

RAD0401 (1)

UCLUELET RADAR COUNTS

Observer: SHIRLEY BAIRD
Date: Day: 1 Month: APRIL 19: 92
Time: (24 hr clock): 800
Windspeed (knots/hr):
Amphitrite: calm Estevan: N 09

Estimated Number of Boats:

Area 21

Sub 52 (Swiftsure)	2
53	–
Total	2

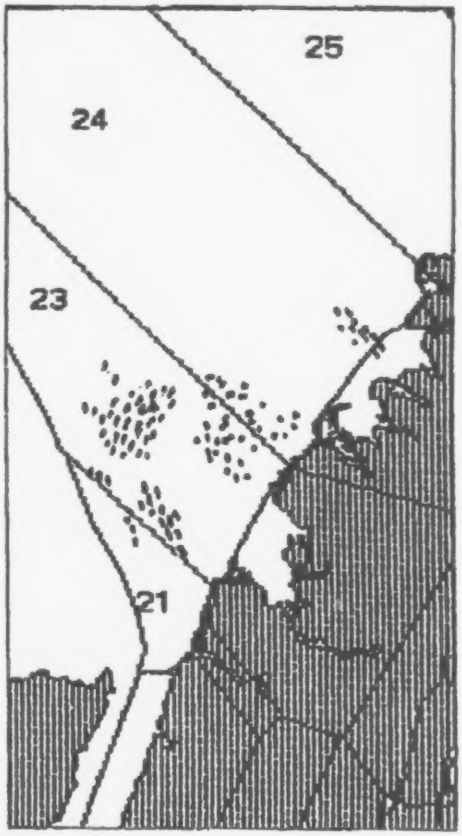
Area 23

Sub 55 (7 & 12 mile)	18
57 (20 mile)	72
58 (South Bank)	47
59 (Big Bank)	21
113 (Finger Bank)	–
Total	158

Area 24

Sub 60 (La Perouse)	114
61	–
62 (Portland Pt)	44
63	–
64 (Estevan Pt)	7
65	–
Total	165

Total for SWTR 325



Comments: Some fog off-shore.

1

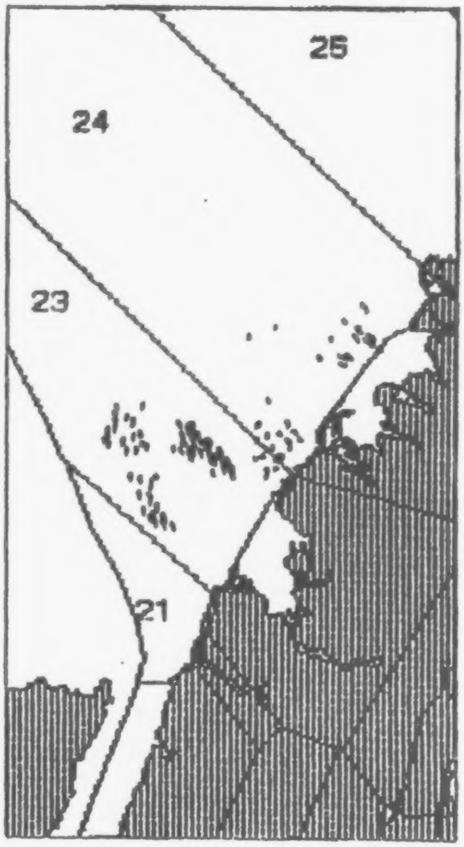
RAD0402 (1)

UCLUELET RADAR COUNTS

Observer: SHIRLEY BAIRD
Date: Day: 2 Month: 04 19: 92
Time: (24 hr clock): 800
Windspeed (knots/hr):
Amphitrite: SE 08 Estevan: calm

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	1
53	1
Total	2
Area 23	
Sub 56 (7 & 12 mile)	19
57 (20 mile)	71
58 (South Bank)	75
59 (Big Bank)	2
113 (Finger Bank)	—
Total	167
Area 24	
Sub 60 (La Perouse)	84
61	3
62 (Portland Pt)	40
63	7
64 (Estevan Pt)	7
65	5
Total	146
Total for SWTR	315



Comments: Some fog and low cloud in distance.

UCLUELET RADAR COUNTS

Observer: SHIRLEY BAIRD
Date: Day: 03 Month: 04 19: 92
Time: (24 hr clock): 800
Windspeed (knots/hr):
Amphitrite: N.W 10 Estevan: NW 03

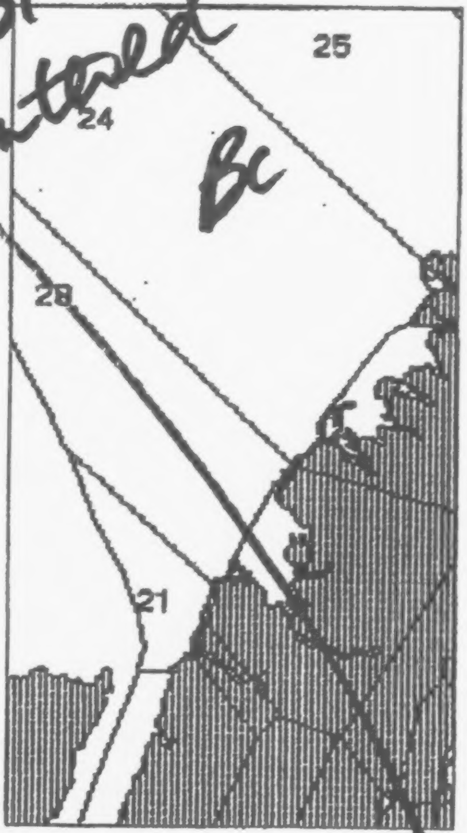
Estimated Number of Boats:

Area 21
Sub 52 (Swiftsure) ______
53 ______
Total ☐

Area 23
Sub 56 (7 & 12 mile) ______
57 (20 mile) ______
58 (South Bank) ______
59 (Big Bank) ______
113 (Finger Bank) ______
Total ☐

Area 24
Sub 60 (La Perouse) ______
61 ______
62 (Portland Pt) ______
63 ______
64 (Estevan Pt) ______
65 ______
Total ☐

Total for SWTR ☐



not entered
BC

Comments: Sea clutter makes it impossible to make a boat count. I can see about 17 boats in area 54 and about 6 in area 62. I can see about 10 in area 55.

041

RAD0406 (2)

UCLUELET RADAR COUNTS

Observer: SHIRLEY BAIRD

Date: Day: 04 Month: 04 19: 92

Time: (24 hr clock): 8 00

Windspeed (knots/hr):

Amphitrite: E.10 Estevan: E. 07

Estimated Number of Boats:

Area 21

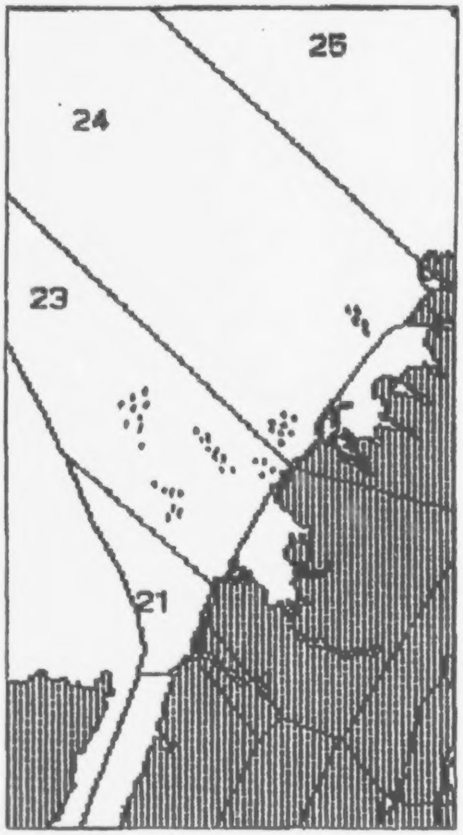
Sub 52 (Swiftsure)	–
53	–
Total	–

Area 23

Sub 55 (7 & 12 mile)	6
57 (20 mile)	28
58 (South Bank)	41
59 (Big Bank)	2
113 (Finger Bank)	–
Total	77

Area 24

Sub 60 (La Perouse)	6
61	–
62 (Portland Pt)	30
63	1
64 (Estevan Pt)	6
65	–
Total	43



Total for SWTR 120

Comments: Weather conditions make boats difficult to see. – Sky - cloudy.

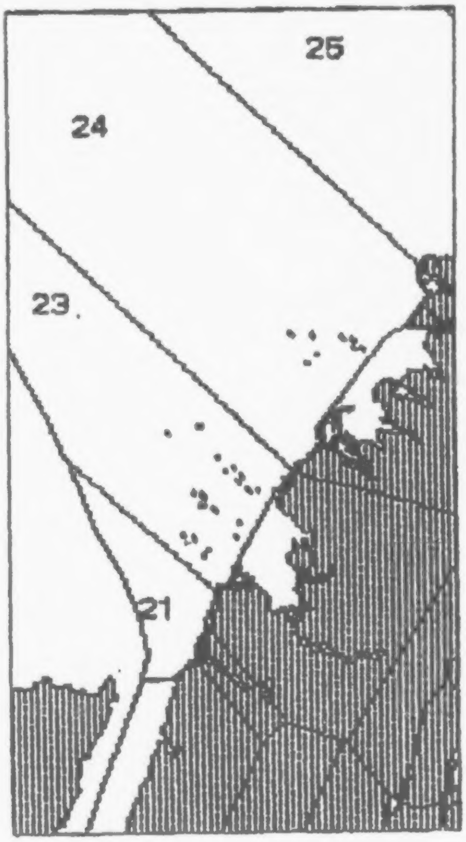
1

UCLUELET RADAR COUNTS

Observer: SHIRLEY BAIRD
Date: Day: 05 Month: 04 19: 92
Time: (24 hr clock): 800
Windspeed (knots/hr):
Amphitrite: E. 05 Estevan: E. 11

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	—
53	—
Total	—
Area 23	
Sub 55 (7 & 12 mile)	5
57 (20 mile)	20
58 (South Bank)	35
59 (Big Bank)	—
113 (Finger Bank)	—
Total	60
Area 24	
Sub 60 (La Perouse)	9
61	—
62 (Portland Pt)	22
63	—
64 (Estevan Pt)	1
65	—
Total	32
Total for SWTR	92



Comments: Continues to be considerable sea return.
- Cloudy, rainy.

UCLUELET RADAR COUNTS

Observer: S. BAIRD
Date: Day: 01 Month: 07 19: 92
Time: (24 hr clock): 8:00
Windspeed (knots/hr):
Amphitrite: NW 04 Estevan: NW 10

Estimated Number of Boats:

Area 21

Sub 52 (Swiftsure)	35
53	23
Total	58

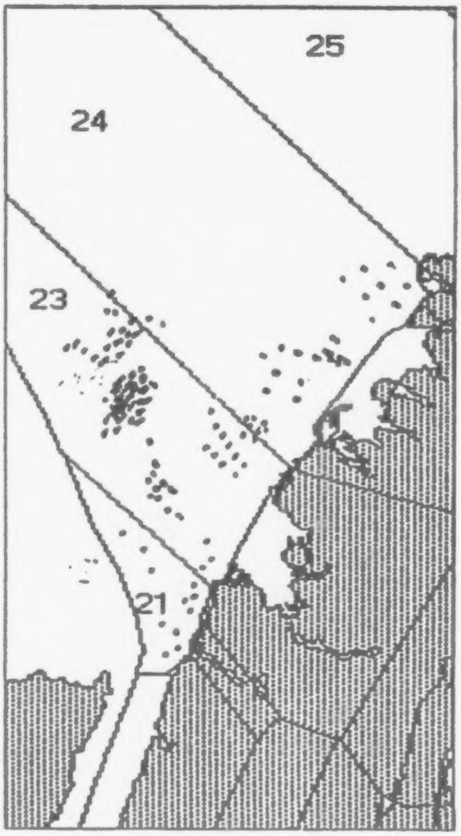
Area 23

Sub 55 (7 & 12 mile)	18	
57 (20 mile)	47	
58 (South Bank)	39	
59 (Big Bank)	98	
113 (Finger Bank)	6	
Total	208	64

Area 24

Sub 60 (La Perouse)	53
61	26
62 (Portland Pt)	35
63	3
64 (Estevan Pt)	23
65	2
Total	142

Total for SWTR 408

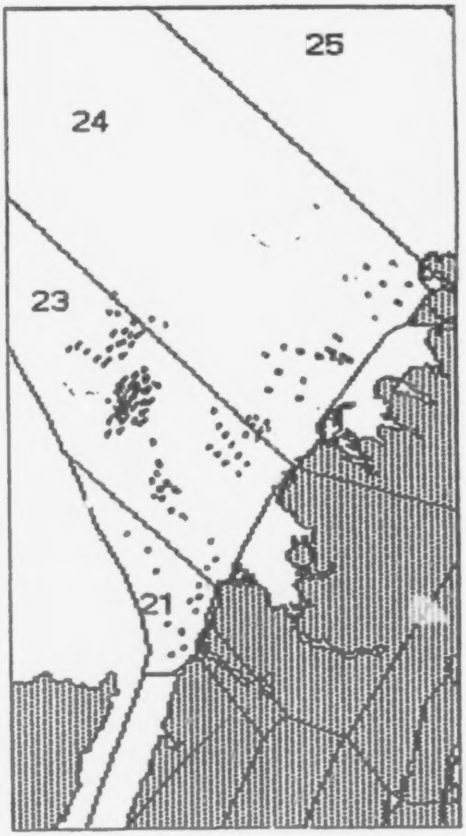


Comments: Overcast

UCLUELET RADAR COUNTS

Observer: S. BAIRD
Date: Day: 01 Month: 07 19: 92
Time: (24 hr clock): 8:00
Windspeed (knots/hr):
Amphitrite: NW 04 Estevan: NW 10

Estimated Number of Boats:



Area 21

Sub 52 (Swiftsure)	35
53	23
Total	58

Area 23

Sub 55 (7 & 12 mile)	18
57 (20 mile)	47
58 (South Bank)	39
59 (Big Bank)	98
113 (Finger Bank)	6
Total	208

Area 24

Sub 60 (La Perouse)	53
61	26
62 (Portland Pt)	35
63	3
64 (Estevan Pt)	23
65	2
Total	142

Total for SWTR 408

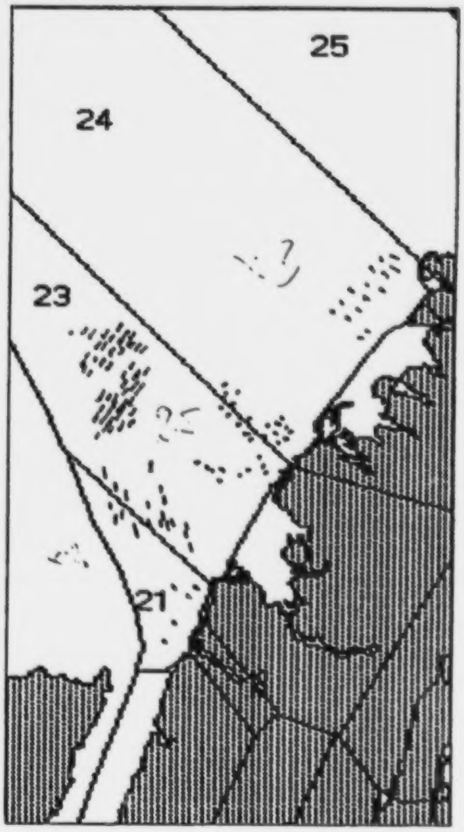
Comments: Overcast

UCLUELET RADAR COUNTS

Observer: S. BAIRD
Date: Day: 02 Month: 07 19: 92
Time: (24 hr clock): 8:00
Windspeed (knots/hr):
Amphitrite: NW 04 Estevan: NW 12

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	7
53	11
Total	18
Area 23	
Sub 55 (7 & 12 mile)	17
57 (20 mile)	32
58 (South Bank)	36
59 (Big Bank)	94
113 (Finger Bank)	17
Total	196
Area 24	
Sub 60 (La Perouse)	60
61	3
62 (Portland Pt)	14
63	1
64 (Estevan Pt)	22
65	–
Total	100
Total for SWTR	314



Comments: Overcast – Some fog over water.

UCLUELET RADAR COUNTS

Observer: S. BAIRD
Date: Day: 03 Month: 07 19: 92
Time: (24 hr clock): 8:00
Windspeed (knots/hr):
Amphitrite: NW 06 Estevan: NW 04

Estimated Number of Boats:

Area 21

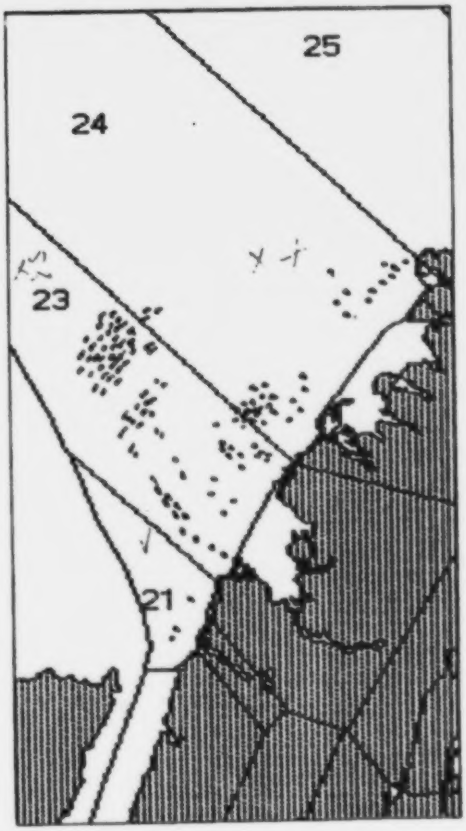
Sub 52 (Swiftsure)	3
53	–
Total	3

Area 23

Sub 55 (7 & 12 mile)	9
57 (20 mile)	35
58 (South Bank)	28
59 (Big Bank)	71
113 (Finger Bank)	6
Total	149

Area 24

Sub 60 (La Perouse)	73
61	14
62 (Portland Pt)	28
63	1
64 (Estevan Pt)	19
65	1
Total	136



Total for SWTR 288

Comments: Overcast

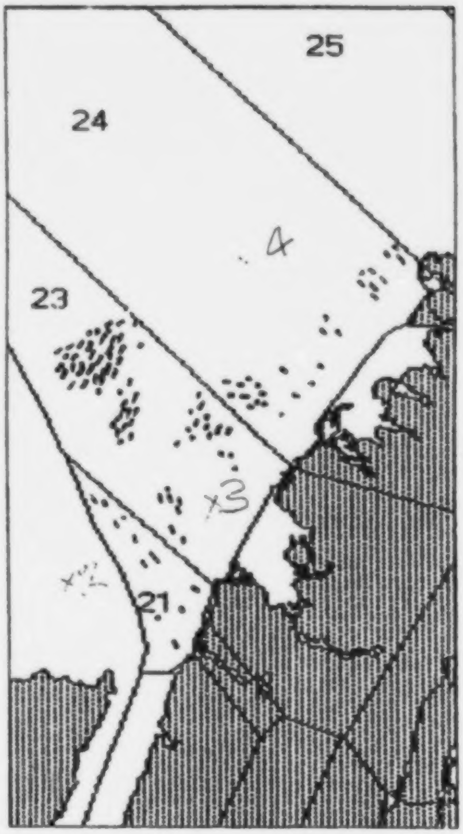
JOT 1991

UCLUELET RADAR COUNTS

Observer: S. BAIRD
Date: Day: 04 Month: 07 19: 91
Time: (24 hr clock): 8:00
Windspeed (knots/hr):
Amphitrite: NW 07 Estevan: NW 09

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	6
53	10
Total	16
Area 23	
Sub 55 (7 & 12 mile)	9
57 (20 mile)	28
58 (South Bank)	8
59 (Big Bank)	105
113 (Finger Bank)	10
Total	160
Area 24	
Sub 60 (La Perouse)	64
61	12
62 (Portland Pt)	23
63	2
64 (Estevan Pt)	11
65	3
Total	115
Total for SWTR	291



Comments: SUNNY (SOME HIGH CLOUD)

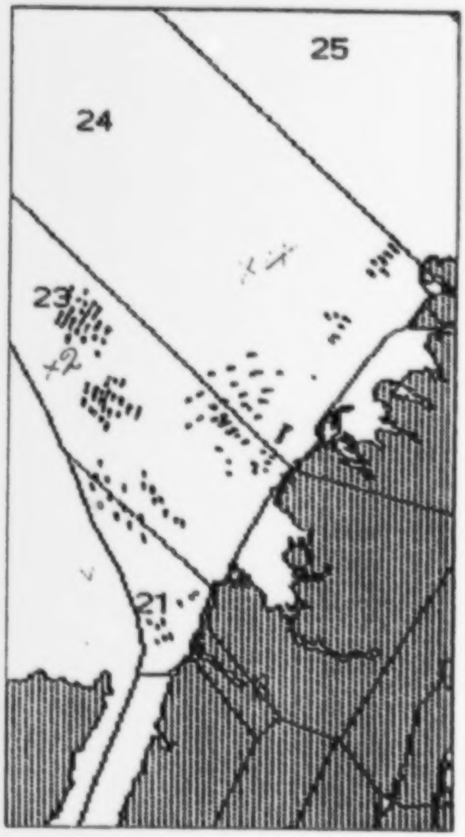
JOT 1991

UCLUELET RADAR COUNTS

Observer: S. BAIRD
Date: Day: 05 Month: 07 19: 92
Time: (24 hr clock): 8:00
Windspeed (knots/hr):
Amphitrite: Calm Estevan: SE 04

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	9
53	5
Total	14
Area 23	
Sub 55 (7 & 12 mile)	4
57 (20 mile)	28
58 (South Bank)	9
59 (Big Bank)	77
113 (Finger Bank)	20
Total	138
Area 24	
Sub 60 (La Perouse)	59
61	11
62 (Portland Pt)	21
63	2
64 (Estevan Pt)	14
65	1
Total	108
Total for SWTR	260



Comments: CLOUDY

UCLUELET RADAR COUNTS

Observer: S BAIRD

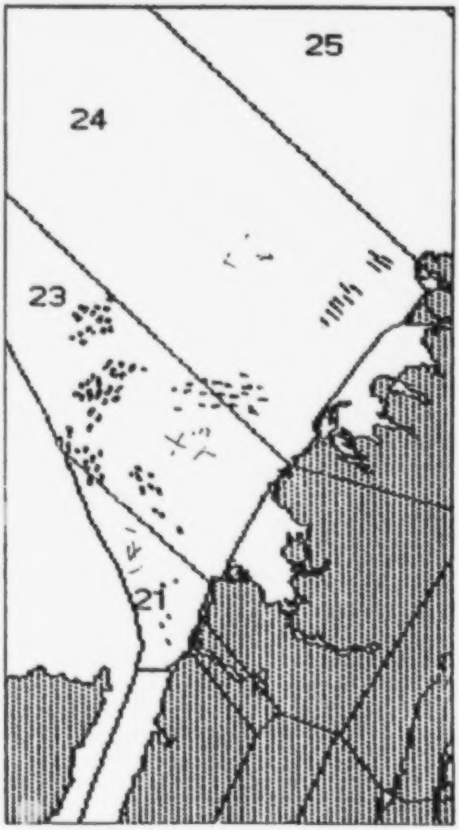
Date: Day: 06. Month: 07 19: 92

Time: (24 hr clock): 8:00

Windspeed (knots/hr):

Amphitrite: NW 07 Estevan: NW 11

Estimated Number of Boats:



Area 21

Sub 52 (Swiftsure)	4
53	18
Total	22

Area 23

Sub 55 (7 & 12 mile)	4
57 (20 mile)	16
58 (South Bank)	17
59 (Big Bank)	66
113 (Finger Bank)	26
Total	129

Area 24

Sub 60 (La Perouse)	46
61	9
62 (Portland Pt)	5
63	0
64 (Estevan Pt)	20
65	2
Total	~~68~~ 82

Total for SWTR	~~219~~ 233

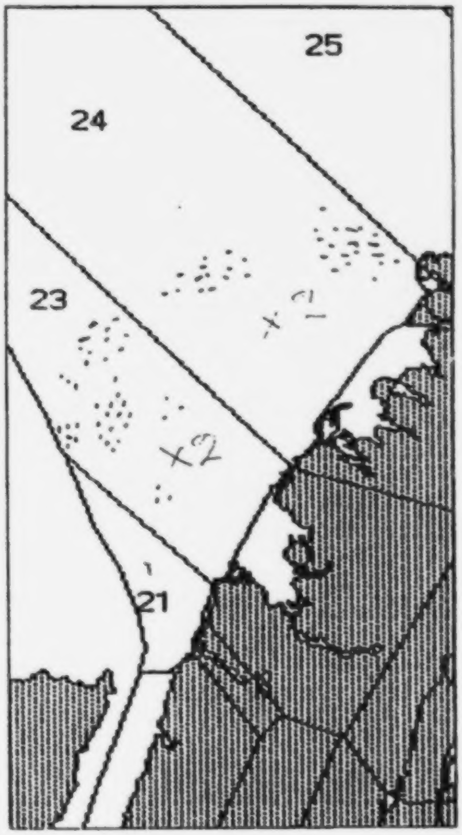
Comments: CLOUDY

UCLUELET RADAR COUNTS

Observer: Barbara Illerbrun
Date: Day: 07 Month: 07 19: 92
Time: (24 hr clock): 0800
Windspeed (knots/hr):
Amphitrite: NW'5 Estovan: Nw'12

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	1
53	15
Total	16
Area 23	
Sub 55 (7 & 12 mile)	3
57 (20 mile)	28
58 (South Bank)	13
59 (Big Bank)	30
113 (Finger Bank)	12
Total	86
Area 24	
Sub 60 (La Perouse)	14
61	9
62 (Portland Pt)	10
63	1
64 (Estovan Pt)	14
65	2
Total	50
Total for SWTR	152



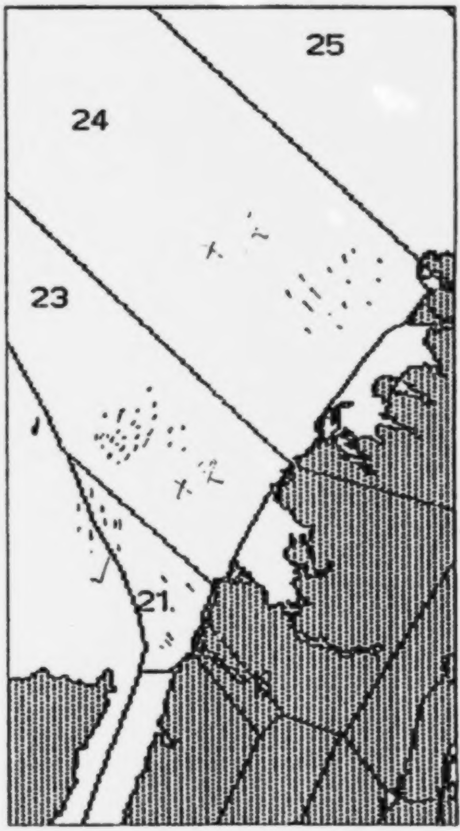
Comments: Cloudy

UCLUELET RADAR COUNTS

Observer: Barbara Illerbrun
Date: Day: 08 Month: 07 19: 92
Time: (24 hr clock): 0800
Windspeed (knots/hr):
Amphitrite: SW 3 Estevan: NW 18

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	9
53	11
Total	20
Area 23	
Sub 55 (7 & 12 mile)	1
57 (20 mile)	32
58 (South Bank)	7
59 (Big Bank)	4
113 (Finger Bank)	1
Total	45
Area 24	
Sub 60 (La Perouse)	1
61	5
62 (Portland Pt)	8
63	0
64 (Estevan Pt)	15
65	0
Total	29
Total for SWTR	94



Comments: Area 21 : sub 53 probably not troller vessels (sport); some FOG.

UCLUELET RADAR COUNTS

Observer: Barbara Hilebrun
Date: Day: 09 Month: 7 19: 92
Time: (24 hr clock): 0800
Windspeed (knots/hr):
Amphitrite: NWO calm Estevan: SE2

Estimated Number of Boats:

Area 21

Sub 52 (Swiftsure)	4
53	0
Total	4

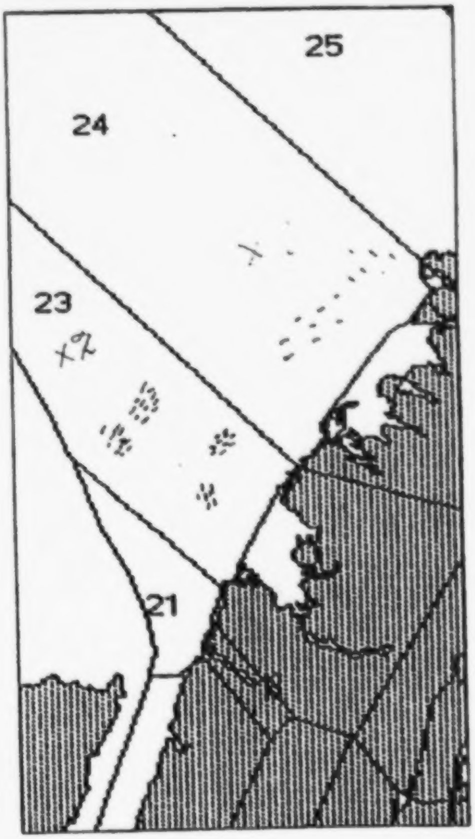
Area 23

Sub 55 (7 & 12 mile)	4
57 (20 mile)	32
58 (South Bank)	31
59 (Big Bank)	4
113 (Finger Bank)	4
Total	75

Area 24

Sub 60 (La Perouse)	6
61	3
62 (Portland Pt)	13
63	4
64 (Estevan Pt)	14
65	2
Total	42

Total for SWTR 121



Comments:

UCLUELET RADAR COUNTS

Observer: Barbara Illerbrun
Date: Day: 10 Month: 07 19: 92
Time: (24 hr clock): 0800
Windspeed (knots/hr):
Amphitrite: SE 3 Estevan: NW 21+26

Estimated Number of Boats:

Area 21
Sub 52 (Swiftsure) 2
53 1

Total 3

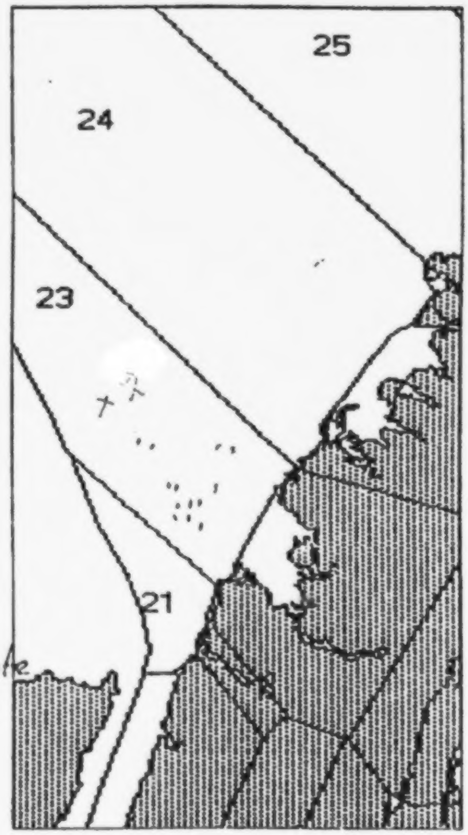
Area 23
Sub 55 (7 & 12 mile) 4
57 (20 mile) 13
58 (South Bank) 5
59 (Big Bank) 6
113 (Finger Bank) 4

Total 32

Area 24
Sub 60 (La Perouse)
61
62 (Portland Pt)
63
64 (Estevan Pt)
65

estimate only

Total 15



Total for SWTR 50

Comments: Considerable sea clutter, v. difficult to determine approx. troller vessel number. (especially in area 24).
FOG

UCLUELET RADAR COUNTS

Observer: Barbara Illerbrun
Date: Day: 11 Month: 07 19: 92
Time: (24 hr clock): 0800
Windspeed (knots/hr):
Amphitrite: SE 6 Estevan: SE 5

Estimated Number of Boats:

Area 21

Sub 52 (Swiftsure)	2
53	2
Total	4

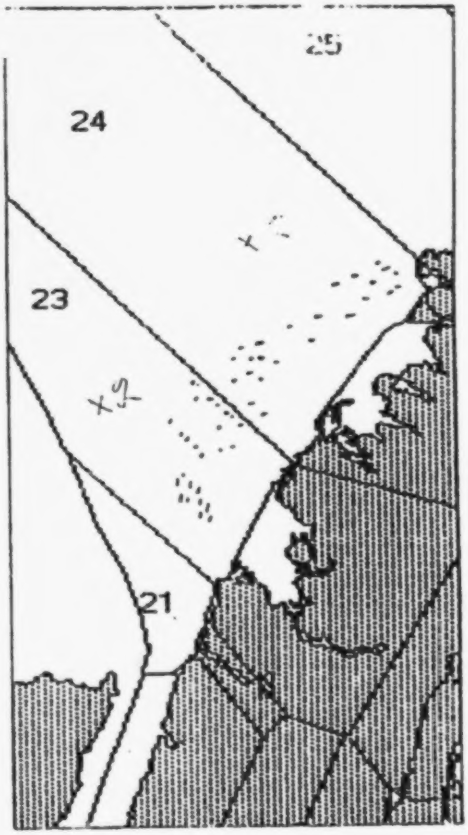
Area 23

Sub 55 (7 & 12 mile)	8
57 (20 mile)	19
58 (South Bank)	20
59 (Big Bank)	4
113 (Finger Bank)	2
Total	53

Area 24

Sub 60 (La Perouse)	15
61	2
62 (Portland Pt)	15
63	0
64 (Estevan Pt)	10
65	0
Total	42

Total for SWTR 99



Comments:

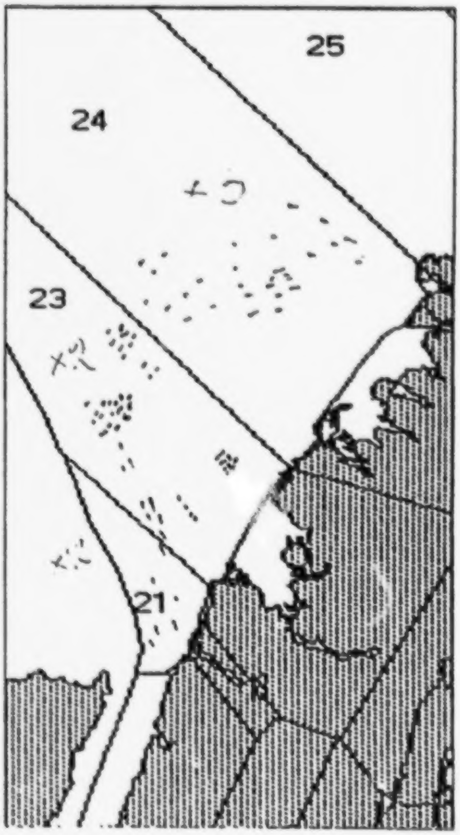
Day Boats & Packers are out BY 9:30 AM

UCLUELET RADAR COUNTS

Observer: Barbara Illerbrun
Date: Day: 12 Month: 07 19: 92
Time: (24 hr clock): 0800
Windspeed (knots/hr):
Amphitrite: NW4 Estevan: calm (fog)

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	6
53	13
Total	19
Area 23	
Sub 55 (7 & 12 mile)	5
57 (20 mile)	34
58 (South Bank)	24
59 (Big Bank)	15
113 (Finger Bank)	1
Total	79
Area 24	
Sub 60 (La Perouse)	28
61	20
62 (Portland Pt)	24
63	5
64 (Estevan Pt)	5
65	4
Total	86
Total for SWTR	184



Comments: Area 21 sub 53 - vessels unlikely trollers.
Cloudy - Amphitrite point - raining

JOT 1991

UCLUELET RADAR COUNTS

Observer: Barbara Illerbrun
Date: Day: 13 Month: 07 19: 92
Time: (24 hr clock): 0800
Windspeed (knots/hr):
Amphitrite: NW 9 Estevan: NW 6

Estimated Number of Boats:

Area 21

Sub 52 (Swiftsure)	0
53	3
Total	3

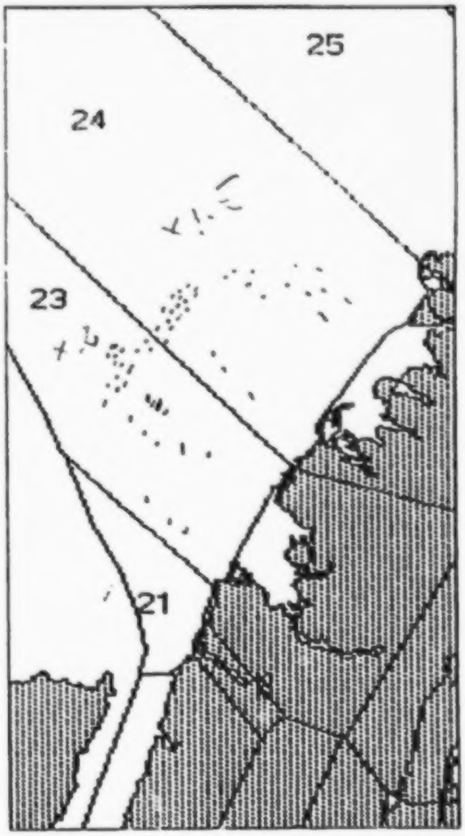
Area 23

Sub 55 (7 & 12 mile)	2
57 (20 mile)	16
58 (South Bank)	15
59 (Big Bank)	20
113 (Finger Bank)	8
Total	61

Area 24

Sub 60 (La Perouse)	8
61	20
62 (Portland Pt)	12
63	1
64 (Estevan Pt)	6
65	0
Total	47

Total for SWTR 111



Comments: Note boats concentrated in sub areas 59/61
Cloudy, no fog.

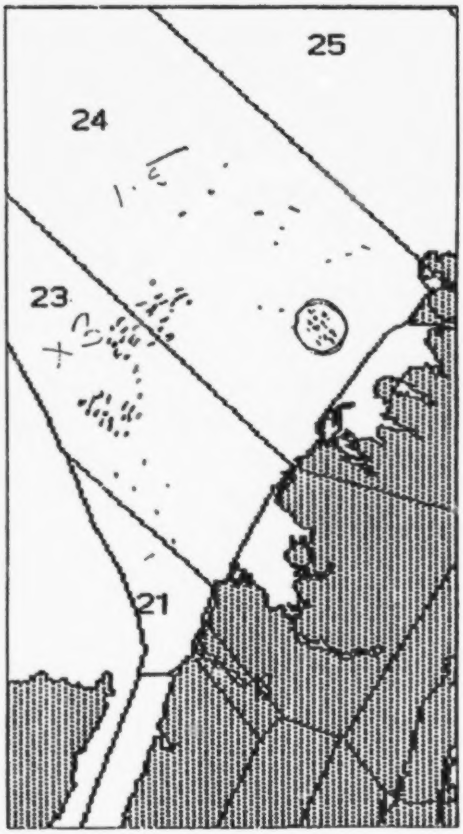
JOT 1991

UCLUELET RADAR COUNTS

Observer: Barbara Illerbrun
Date: Day: 14 Month: 07 19: 92.
Time: (24 hr clock): 0800
Windspeed (knots/hr):
Amphitrite: Nil 6 Estevan: Nil

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	3
53	4.
Total	7
Area 23	
Sub 55 (7 & 12 mile)	3
57 (20 mile)	29
58 (South Bank)	30
59 (Big Bank)	21
113 (Finger Bank)	4
Total	87
Area 24	
Sub 60 (La Perouse)	9
61	15
62 (Portland Pt)	21
63	0
64 (Estevan Pt)	6
65	4
Total	55
Total for SWTR	149



Comments: Area 24 sub 62: approx. 10 sport fishing Boats .: (-10)
* Sun - Blueskies at Amphitrite Point.

JOT 1991

UCLUELET RADAR COUNTS

Observer: S. BAIRD
Date: Day: 15 Month: 07 19: 92
Time: (24 hr clock): 800
Windspeed (knots/hr):
Amphitrite: N 01 Estevan: NW 06

Estimated Number of Boats:

Area 21

Sub 52 (Swiftsure)	7
53	3+[illegible])
Total	10

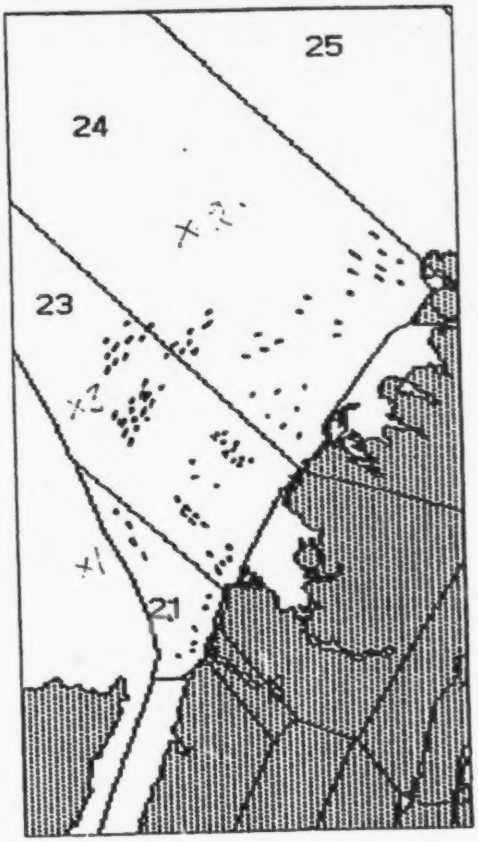
Area 23

Sub 55 (7 & 12 mile)	24
57 (20 mile)	24
58 (South Bank)	47
59 (Big Bank)	44
113 (Finger Bank)	5
Total	144

Area 24

Sub 60 (La Perouse)	39
61	13
62 (Portland Pt)	18
63	2
64 (Estevan Pt)	13
65	3
Total	88

Total for SWTR 242



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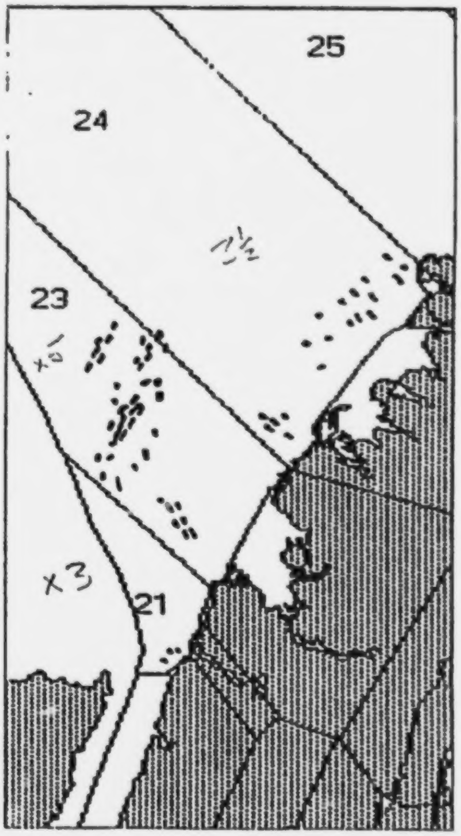
nments: SUNNY

UCLUELET RADAR COUNTS

Observer: S. BAIRD
Date: Day: 16 Month: 07 19: 92
Time: (24 hr clock): 8:00
Windspeed (knots/hr):
Amphitrite: calm Estevan: NW 10

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	5
53	5
Total	10
Area 23	
Sub 55 (7 & 12 mile)	88
57 (20 mile)	31
58 (South Bank)	42
59 (Big Bank)	27
113 (Finger Bank)	7
Total	195
Area 24	
Sub 60 (La Perouse)	12
61	20
62 (Portland Pt)	21
63	4
64 (Estevan Pt)	14
65	1
Total	72
Total for SWTR	277



Comments: SUNNY

UCLUELET RADAR COUNTS

Observer: S BAIRD
Date: Day: 17 Month: 07 19: 92
Time: (24 hr clock): 8.00
Windspeed (knots/hr):
Amphitrite: NE 01 Estevan: W 02

Estimated Number of Boats:

Area 21

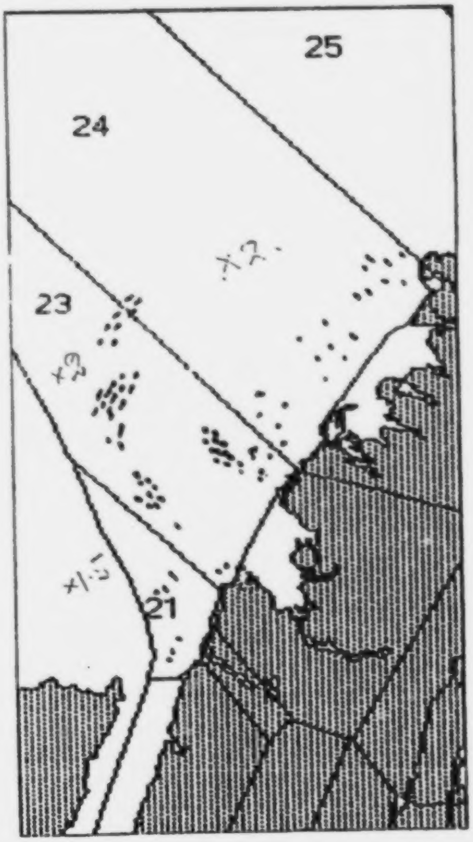
Sub 52 (Swiftsure)	6
53	3
Total	9

Area 23

Sub 55 (7 & 12 mile)	4
57 (20 mile)	37
58 (South Bank)	39
59 (Big Bank)	15
113 (Finger Bank)	4
Total	99

Area 24

Sub 60 (La Perouse)	27
61	15
62 (Portland Pt)	11
63	1
64 (Estevan Pt)	~~15~~12
65	1
Total	67



Total for SWTR 175

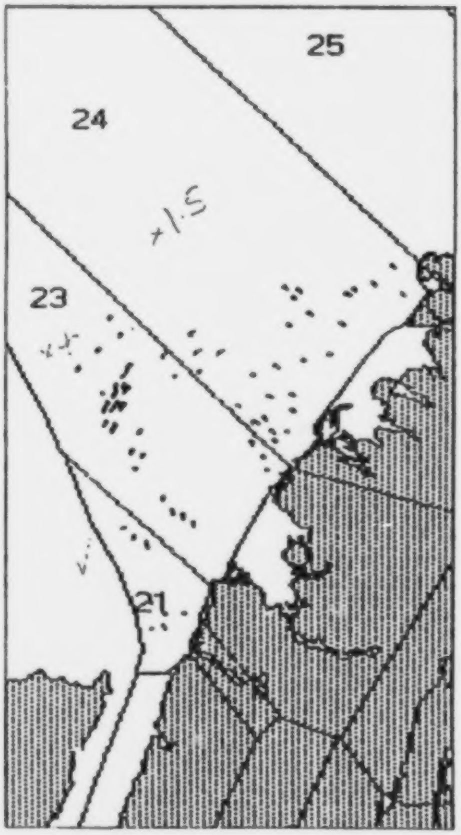
Comments: SUNNY

UCLUELET RADAR COUNTS

Observer: S. BAIRD
Date: Day: 18 Month: 07 19: 92
·Time: (24 hr clock): 800
Windspeed (knots/hr):
Amphitrite: SE 09 Estevan: NW 06

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	37
53	4
Total	11
Area 23	
Sub 55 (7 & 12 mile)	3
57 (20 mile)	45
58 (South Bank)	32
59 (Big Bank)	13
113 (Finger Bank)	–
Total	93
Area 24	
Sub 60 (La Perouse)	21
61	9
62 (Portland Pt)	27
63	4
64 (Estevan Pt)	7
65	–
Total	48
Total for SWTR	[illegible] 152.



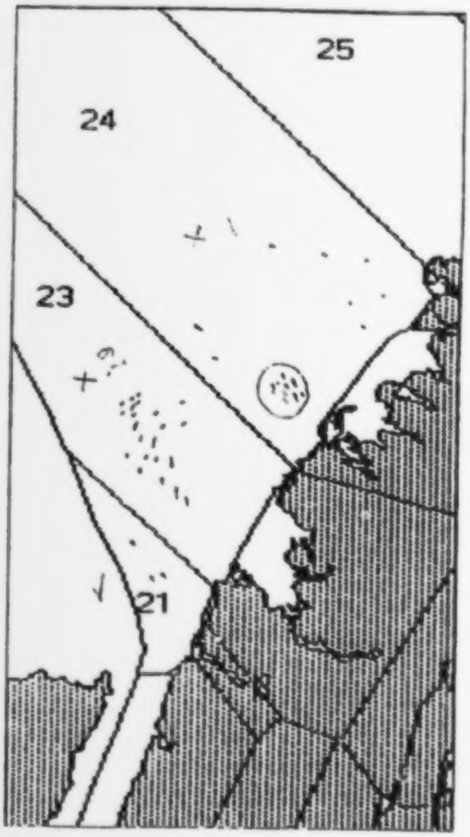
Comments: SUNNY – SOME FOG OFF SHORE

UCLUELET RADAR COUNTS

Observer: Barbara Illerbrun
Date: Day: 11 Month: 07 19: 92
Time: (24 hr clock): 0800
Windspeed (knots/hr):
Amphitrite: SE 15 Estevan: SE 12+19

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	3
53	2
Total	5
Area 23	
Sub 55 (7 & 12 mile)	5
57 (20 mile)	19
58 (South Bank)	8
59 (Big Bank)	10
113 (Finger Bank)	0
Total	42
Area 24	
Sub 60 (La Perouse)	4
61	2
62 (Portland Pt)	5
63	2
64 (Estevan Pt)	5
65	3
Total	21
Total for SWTR	68



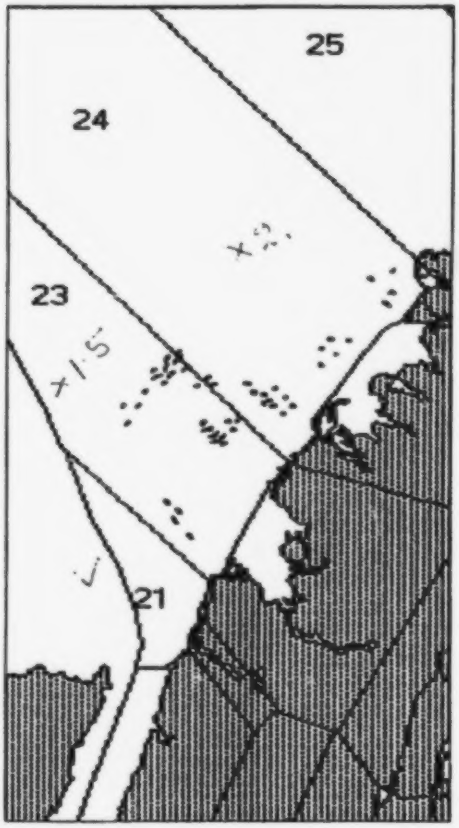
Comments: FOG
Sub 62 (Portland Pt) Sport vessels (#7)

UCLUELET RADAR COUNTS

Observer: S. BAIRD
Date: Day: 20 Month: 07 19: 92
Time: (24 hr clock): 800
Windspeed (knots/hr):
Amphitrite: E 03 Estevan: SE 10 G. 17

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	3
53	–
Total	3
Area 23	
Sub 55 (7 & 12 mile)	3
57 (20 mile)	13
58 (South Bank)	37
59 (Big Bank)	19
113 (Finger Bank)	7
Total	79
Area 24	
Sub 60 (La Perouse)	14
61	5
62 (Portland Pt)	20
63	–
64 (Estevan Pt)	6
65	2
Total	47
Total for SWTR	129



Comments: CLOUDY – FOG OVER WATER

74

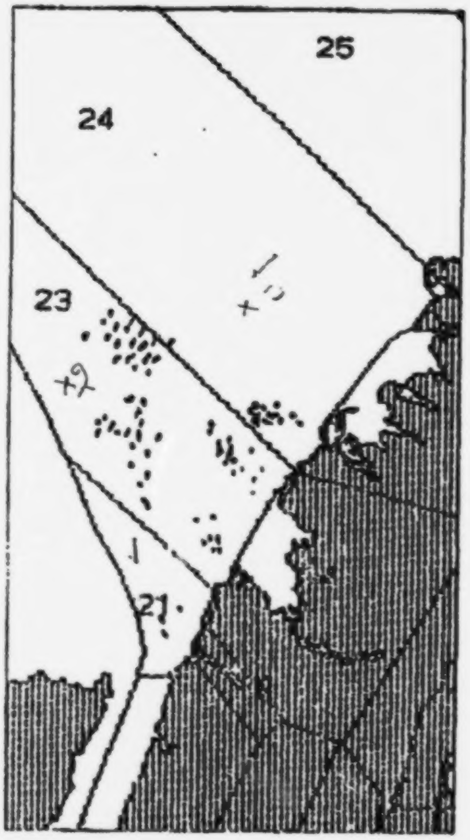
RAD2107(/)

UCLUELET RADAR COUNTS

Observer: S BAIRD
Date: Day: 21 Month: 07 19: 92
Time: (24 hr clock): 800
Windspeed (knots/hr):
Amphitrite: SE 03 Estevan: NW 05

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	3
53	–
Total	3
Area 23	
Sub 55 (7 & 12 mile)	6
57 (20 mile)	26
58 (South Bank)	48
59 (Big Bank)	55
113 (Finger Bank)	6
Total	141
Area 24	
Sub 60 (La Perouse)	17
61	6
62 (Portland Pt)	29
63	3
64 (Estevan Pt)	5
65	2
Total	62
Total for SWTR	206



Comments: Overcast

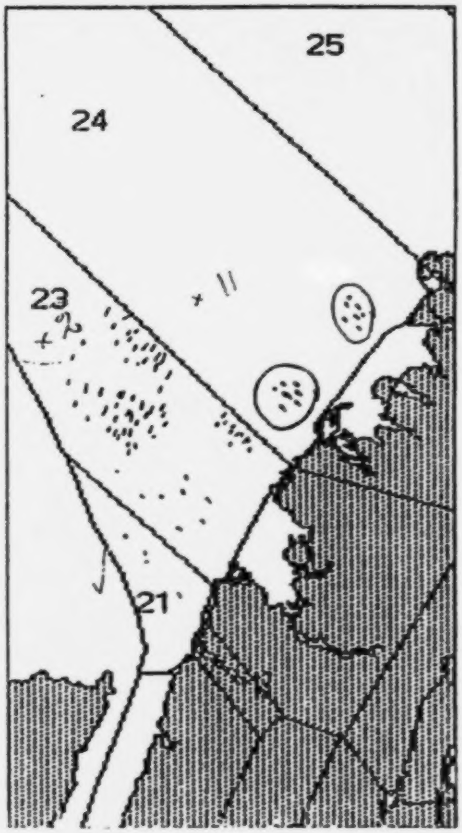
JOT 1991

UCLUELET RADAR COUNTS

Observer: Barbara Illenbrun
Date: Day: 22 **Month:** 07 **19:** 92
Time: (24 hr clock): 0800
Windspeed (knots/hr):
Amphitrite: NW5 **Estevan:** NW10

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	4
53	1
Total	5
Area 23	
Sub 55 (7 & 12 mile)	4
57 (20 mile)	46
58 (South Bank)	38
59 (Big Bank)	59
113 (Finger Bank)	8
Total	155
Area 24	
Sub 60 (La Perouse)	4
61	8
62 (Portland Pt)	4
63	0
64 (Estevan Pt)	3
65	2
Total	21
Total for SW1R	161



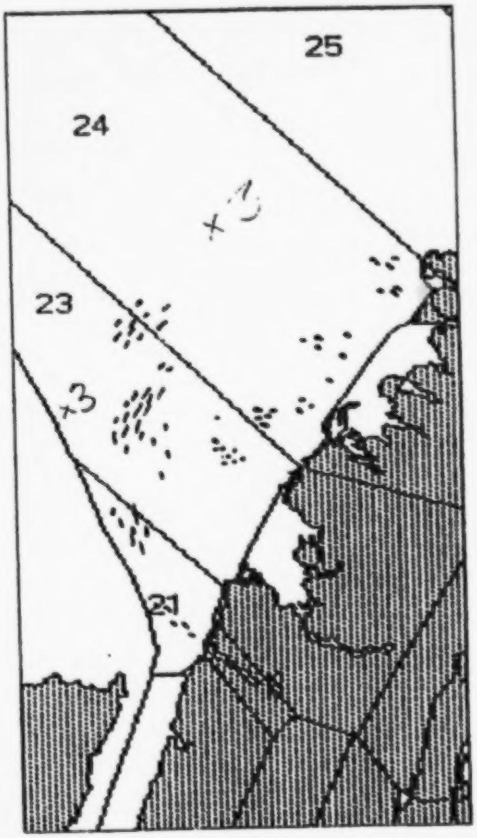
Comments: Cloudy

Confirm Frank Crabb area 24 sub 62., circled areas (approx 7) vessels each.
Are these Sport fishing vessels?

UCLUELET RADAR COUNTS

Observer: S BAIRD
Date: Day: 23 Month: 07 19: 92
Time: (24 hr clock): 800
Windspeed (knots/hr):
Amphitrite: SW 09 Estevan: NW 07

Estimated Number of Boats:



Area 21

Sub 52 (Swiftsure)	5
53	2
Total	7

Area 23

Sub 55 (7 & 12 mile)	7
57 (20 mile)	22
58 (South Bank)	34
59 (Big Bank)	21
113 (Finger Bank)	12
Total	96

Area 24

Sub 60 (La Perouse)	11
61	23
62 (Portland Pt)	20
63	–
64 (Estevan Pt)	7
65	1
Total	62

Total for SWTR 165

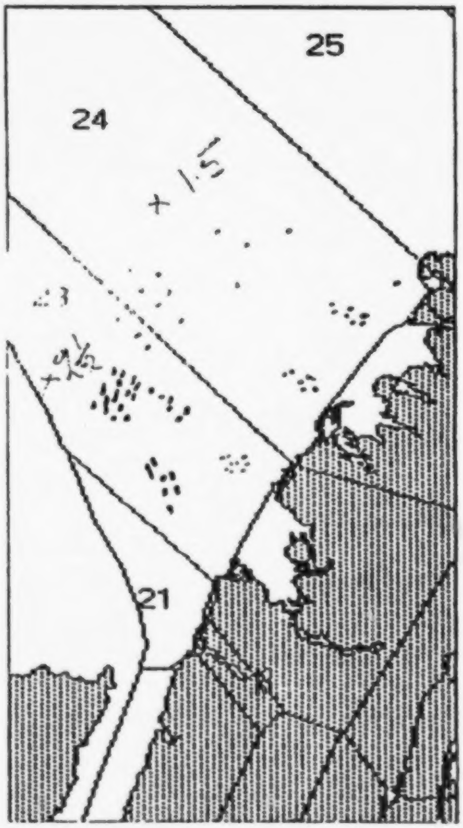
Comments: Some sea return on radar screen. Partly cloudy weather conditions.

UCLUELET RADAR COUNTS

Observer: Barb Illerbrun
Date: Day: 24 Month: 07 19:92
Time: (24 hr clock): 0800
Windspeed (knots/hr):
Amphitrite: SE 10 Estevan: SE 0

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	6
53	12
Total	18
Area 23	
Sub 55 (7 & 12 mile)	11
57 (20 mile)	37
58 (South Bank)	40
59 (Big Bank)	8
113 (Finger Bank)	5
Total	101
Area 24	
Sub 60 (La Perouse)	12
61	5
62 (Portland Pt)	14
63	0
64 (Estevan Pt)	4
65	0
Total	35
Total for SWTR	154



mments: Mainly cloudy, some fog

174

RAD 1500 (1)

UCLUELET RADAR COUNTS

Observer: S. BAIRD

Date: Day: 25 **Month:** 07 **19:** 92

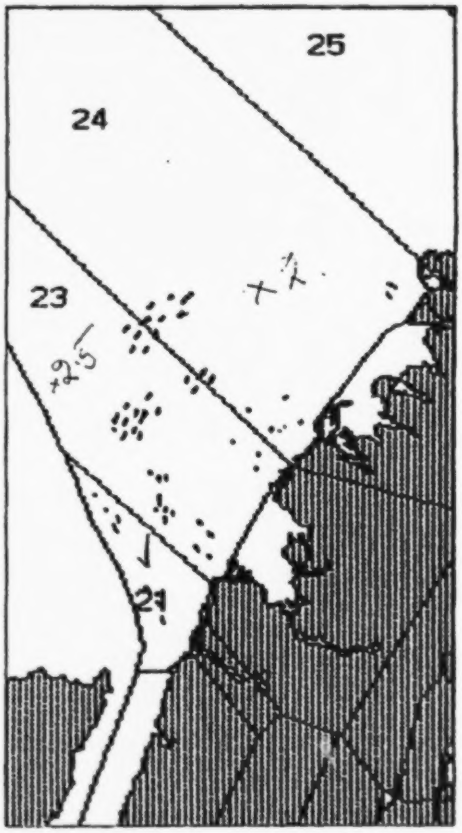
Time: (24 hr clock): 800

Windspeed (knots/hr):

Amphitrite: NW 05 **Estevan:** calm

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	4
53	5
Total	9
Area 23	
Sub 55 (7 & 12 mile)	13
57 (20 mile)	20
58 (South Bank)	37
59 (Big Bank)	13
113 (Finger Bank)	2
Total	85
Area 24	
Sub 60 (La Perouse)	9
61	14
62 (Portland Pt)	13
63	1
64 (Estevan Pt)	3
65	2
Total	42
Total for SWTR	136



Comments: SUNNY - some high cloud

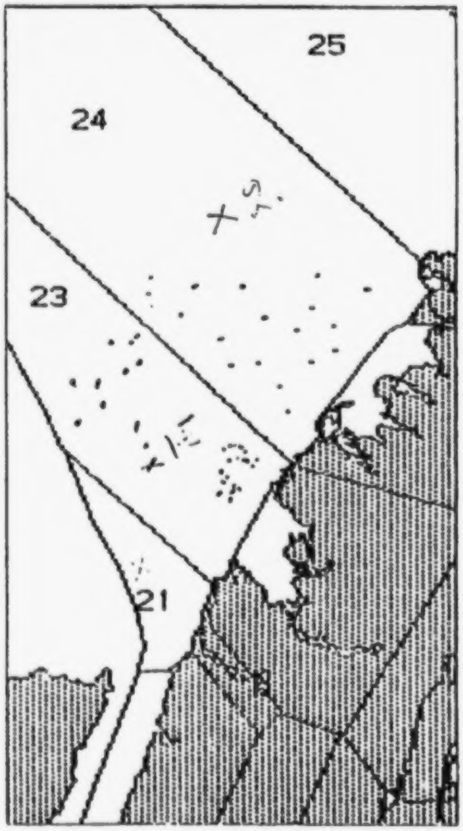
JOT 1991

UCLUELET RADAR COUNTS

Observer: B. Illerbrun
Date, Day: 26 Month: 07 19: 92
Time (24 hr clock): 0800
Windspeed (knots/hr):
Amphitrite: SE 7 Estevan: NW 14

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	3
53	2
Total	5
Area 23	
Sub 55 (7 & 12 mile)	5
57 (20 mile)	5
58 (South Bank)	20
59 (Big Bank)	14
113 (Finger Bank)	3
Total	47
Area 24	
Sub 60 (La Perouse)	5
61	11
62 (Portland Pt)	12
63	4
64 (Estevan Pt)	3
65	1
Total	36
Total for SWTR	88



Comments: Amphitrite, some fog, mainly cloudy.

UCLUELET RADAR COUNTS

Observer: Barbara Illerbrun
Date: Day: 27 Month: 07 19: 92
Time: (24 hr clock): 0800
Windspeed (knots/hr):
Amphitrite: SE 8 Estevan: NW8

Estimated Number of Boats:

Area 21

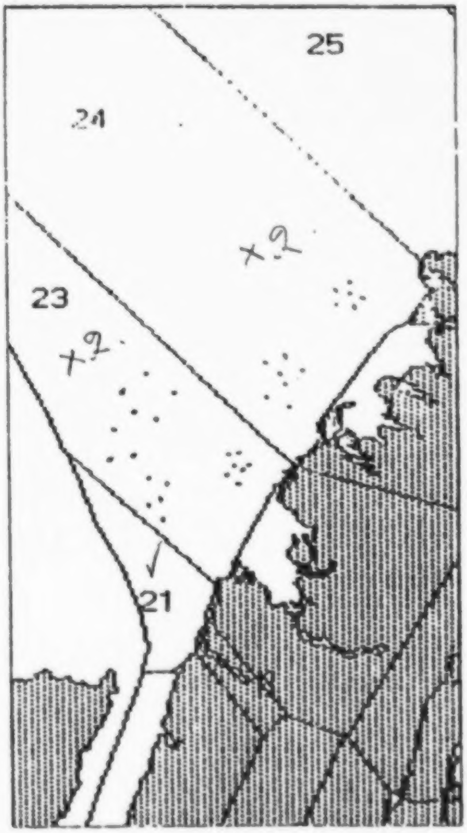
Sub 52 (Swiftsure)	0
53	0
Total	0

Area 23

Sub 55 (7 & 12 mile)	10
57 (20 mile)	8
58 (South Bank)	15
59 (Big Bank)	7
113 (Finger Bank)	3
Total	43

Area 24

Sub 60 (La Perouse)	5
61	5
62 (Portland Pt)	15
63	0
64 (Estevan Pt)	1
65	1
Total	27



Total for SWTR ~~60~~
70

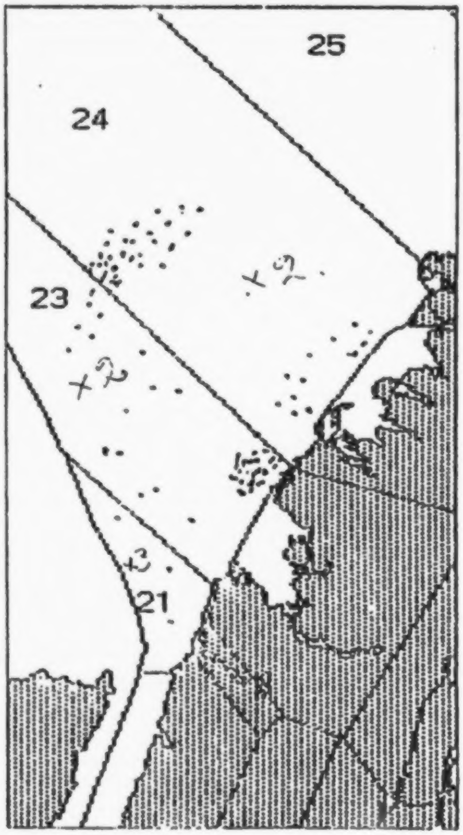
Comments: FOG, not an accurate count for area 23 sub 55, 57 and 58. Not an accurate count for area 24 sub 60 and 62. Appears to be v. few Fishing vessels in both areas. Poor visiblity.

UCLUELET RADAR COUNTS

Observer: B. ILLERBRUN
Date: Day: 28 Month: 07 19: 92
Time: (24 hr clock): 0800
Windspeed (knots/hr):
Amphitrite: NW 2 Estevan: NW 15

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	3
53	10
Total	13
Area 23	
Sub 55 (7 & 12 mile)	15
57 (20 mile)	20
58 (South Bank)	42 *
59 (Big Bank)	14
113 (Finger Bank)	4
Total	95
Area 24	
Sub 60 (La Perouse)	19
61	30 *
62 (Portland Pt)	12
63	7
64 (Estevan Pt)	5
65	2
Total	75
Total for SWTR	183



Comments: Fog, sea clutter and possible sport fishing vessels included. Area 23 sub 58 and area 24 Sub 61 are clearly fishing (troll) vessels. *

UCLUELET RADAR COUNTS

Observer: S. BAIRD
Date: Day: 29 Month: 07 19: 92
Time: (24 hr clock): 800
Windspeed (knots/hr):
Amphitrite: SE 05 Estevan: S 01

Estimated Number of Boats:

Area 21

Sub 52 (Swiftsure)	3
53	6
Total	9

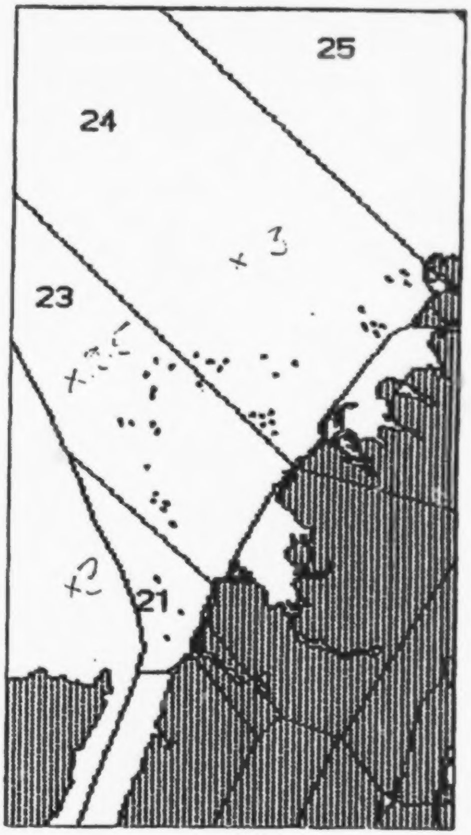
Area 23

Sub 55 (7 & 12 mile)	5
57 (20 mile)	8
58 (South Bank)	16
59 (Big Bank)	12
113 (Finger Bank)	7
Total	48

Area 24

Sub 60 (La Perouse)	18
61	12
62 (Portland Pt)	23
63	2
64 (Estevan Pt)	4
65	–
Total	59

Total for SWTR	116



Comments: FOGGY

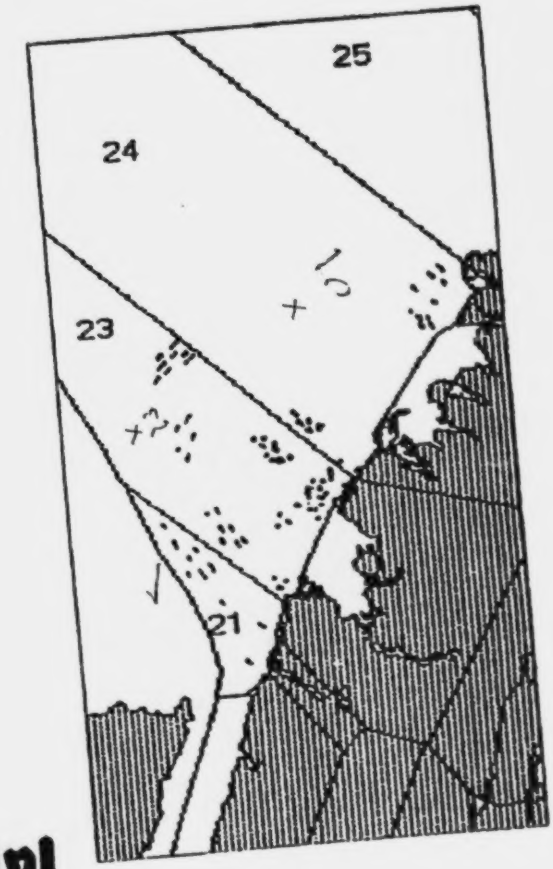
RAD 3007 (1)

UCLUELET RADAR COUNTS

Observer: S. BAIRD
Date: Day: 30 Month: 07 19: 92
Time: (24 hr clock): 800
Windspeed (knots/hr):
Amphitrite: SE 03 Estevan: NE 02

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	1
53	7
Total	8
Area 23	
Sub 55 (7 & 12 mile)	8
57 (20 mile)	16
58 (South Bank)	51
59 (Big Bank)	1
113 (Finger Bank)	6
Total	82
Area 24	
Sub 60 (La Perouse)	42
61	23
62 (Portland Pt)	~~35~~ 30
63	–
64 (Estevan Pt)	6
65	–
Total	~~71~~ 101
Total for SWTR	~~161~~ 191



Comments: SUNNY - Some fog off shore

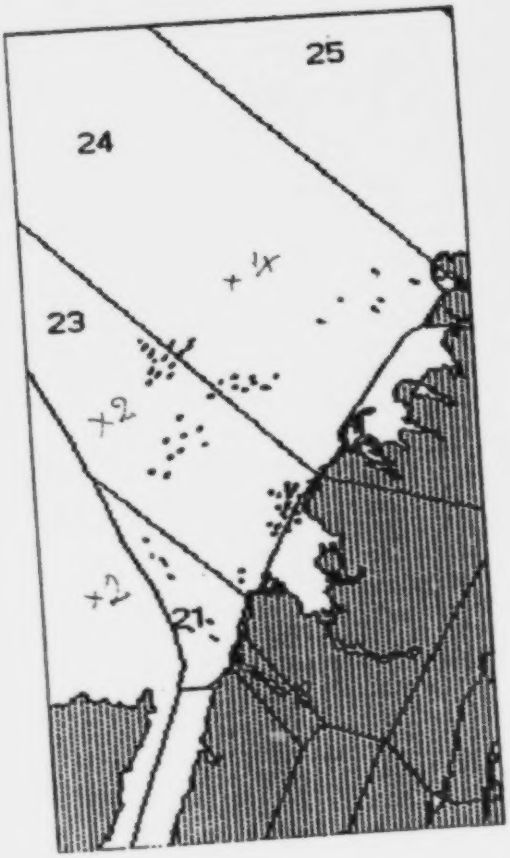
JOT 1991

UCLUELET RADAR COUNTS

Observer: S. BAIRD
Date: Day: 31 Month: 07 19: 92
Time: (24 hr clock): 800
Windspeed (knots/hr):
Amphitrite: SE [illegible]17 Estevan: SE10 + 18

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	5
53	8
Total	13
Area 23	
Sub 55 (7 & 12 mile)	8
57 (20 mile)	11
58 (South Bank)	34
59 (Big Bank)	15
113 (Finger Bank)	5
Total	73
Area 24	
Sub 60 (La Perouse)	22
61	38
62 (Portland Pt)	16
63	4
64 (Estevan Pt)	4
65	1
Total	85
Total for SWTR	171



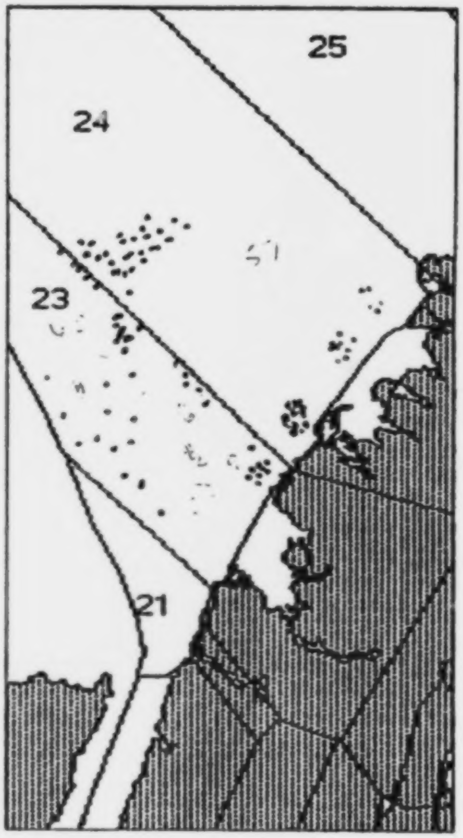
Comments: FOGGY

UCLUELET RADAR COUNTS

Observer: Barbora Illerbrun
Date: Day: 1 Month: 08 19: 92
Time: (24 hr clock): 0800
Windspeed (knots/hr):
Amphitrite: SE 10 Estevan: SE 14 +20

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	4
53	8
Total	12
Area 23	
Sub 55 (7 & 12 mile)	1
57 (20 mile)	10
58 (South Bank)	12
59 (Big Bank)	22
113 (Finger Bank)	4
Total	49
Area 24	
Sub 60 (La Perouse)	16
61	25
62 (Portland Pt)	20
63	1
64 (Estevan Pt)	5
65	2
Total	69
Total for SWTR	130



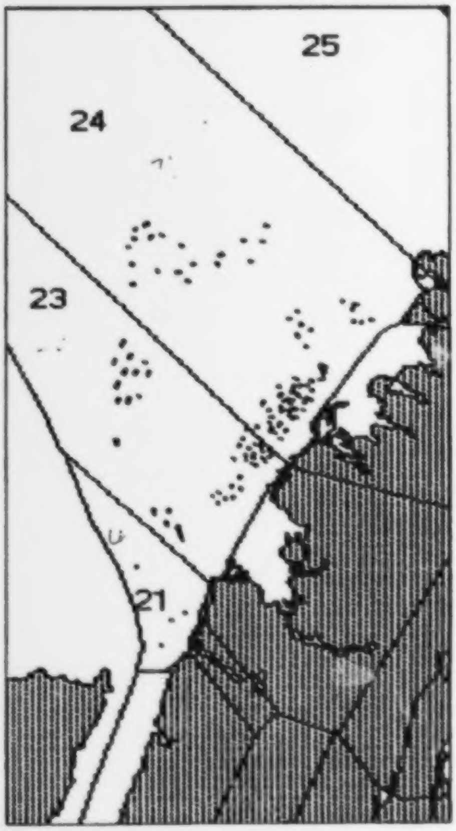
Comments: Very foggy

UCLUELET RADAR COUNTS

Observer: Barbara Illerbrun
Date: Day: 2 Month: 08 19: 92
Time: (24 hr clock): 0800
Windspeed (knots/hr):
Amphitrite: NO calm Estevan: calm

Estimated Number of Boats:

Area 21		
Sub 52 (Swiftsure)	3	
53	9	
Total	12	3
Area 23		
Sub 55 (7 & 12 mile)	5	
57 (20 mile)	16	
58 (South Bank)	32	
59 (Big Bank)	10	
113 (Finger Bank)	8	
Total	71	41.8
Area 24		
Sub 60 (La Perouse)	52	
61	24	
62 (Portland Pt)	23	
63	1	
64 (Estevan Pt)	4	
65	1	
Total	105	[illegible]
Total for SWTR	188	[illegible]



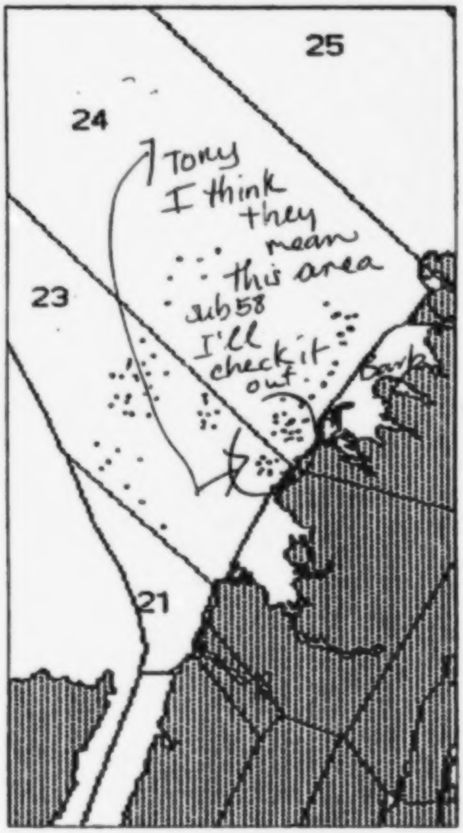
Comments:

UCLUELET RADAR COUNTS

Observer: Barbara Illerbrun
Date: Day: 03 **Month:** 08 **19:** 92
Time: (24 hr clock): 0800
Windspeed (knots/hr):
Amphitrite: SE 4 **Estevan:** NE calm

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	4
53	5
Total	9
Area 23	
Sub 55 (7 & 12 mile)	9
57 (20 mile)	8
58 (South Bank)	48
59 (Big Bank)	8
113 (Finger Bank)	7
Total	80
Area 24	
Sub 60 (La Perouse)	28
61	10
62 (Portland Pt)	25
63	2
64 (Estevan Pt)	5
65	1
Total	71
Total for SWTR	160



Tony I think they mean this area sub58 I'll check it out Barb

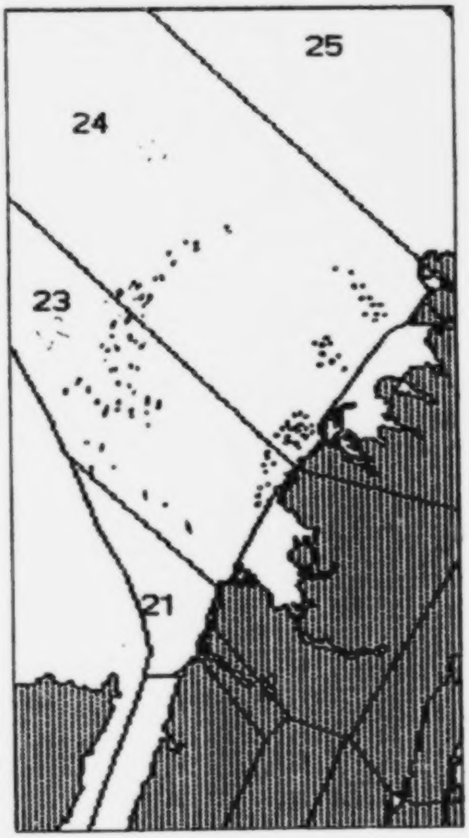
Comments: The TANU reported observing several hundred troller fishing vessels at Quatsino Sound. (027)

UCLUELET RADAR COUNTS

Observer: Barbara Illerbrun
Date: Day: 04 **Month:** 08 **19:** 92
Time: (24 hr clock): 0800
Windspeed (knots/hr):
Amphitrite: E7 **Estevan:** SE7

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	3
53	5
Total	8
Area 23	
Sub 55 (7 & 12 mile)	7
57 (20 mile)	11
58 (South Bank)	20
59 (Big Bank)	16
113 (Finger Bank)	5
Total	59
Area 24	
Sub 60 (La Perouse)	40
61	21
62 (Portland Pt)	31
63	3
64 (Estevan Pt)	2
65	2
Total	99



Total for SWTR ~~99~~ 166 Total SWTR

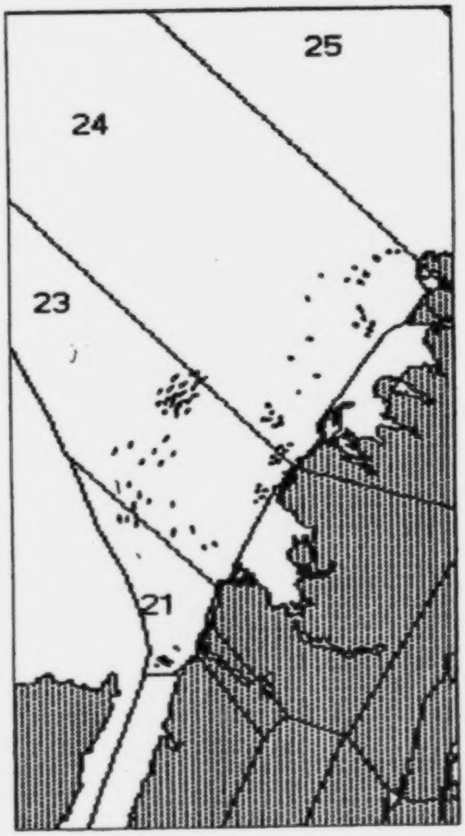
Comments:

UCLUELET RADAR COUNTS

Observer: S. BAIRD
Date: Day: 05 Month: 08 19: 92
Time: (24 hr clock): 800
Windspeed (knots/hr):
Amphitrite: SE 05 Estevan: SE 09

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	24
53	6
Total	30
Area 23	
Sub 55 (7 & 12 mile)	10
57 (20 mile)	10
58 (South Bank)	46
59 (Big Bank)	8
113 (Finger Bank)	7
Total	81
Area 24	
Sub 60 (La Perouse)	83
61	5
62 (Portland Pt)	38
63	1
64 (Estevan Pt)	12
65	1
Total	140
Total for SWTR	251



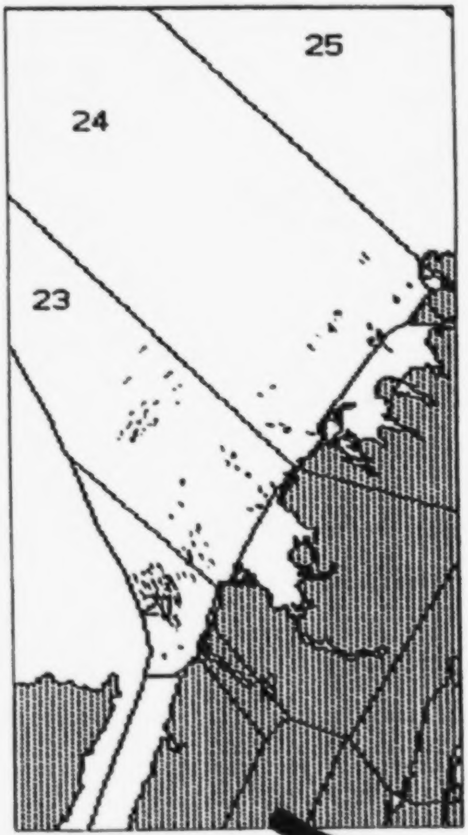
Comments: CLOUDY

UCLUELET RADAR COUNTS

Observer: S. BAIRD
Date: Day: 06 Month: 08 19: 92
Time: (24 hr clock): 800
Windspeed (knots/hr):
Amphitrite: S.E. 04 Estevan: E 04

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	44
53	31
Total	75
Area 23	
Sub 55 (7 & 12 mile)	21
57 (20 mile)	15
58 (South Bank)	22
59 (Big Bank)	23
113 (Finger Bank)	1
Total	82
Area 24	
Sub 60 (La Perouse)	6
61	1
62 (Portland Pt)	32
63	2
64 (Estevan Pt)	2
65	4
Total	47
Total for SWTR	204



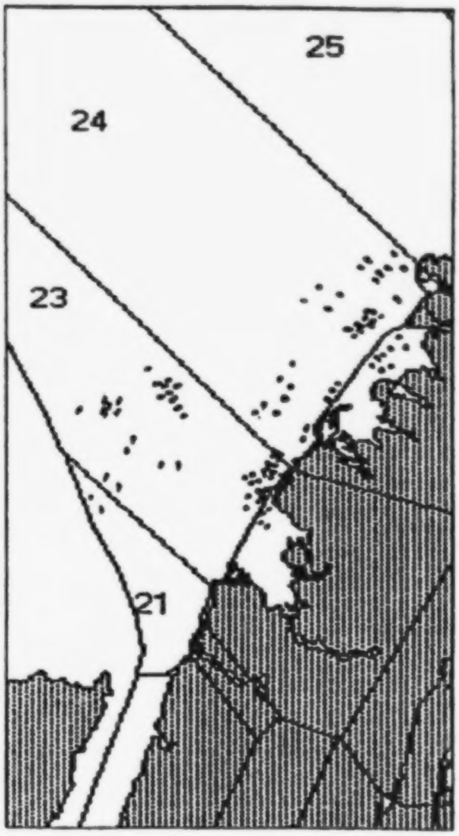
Comments: Dull - 10% precipitation

UCLUELET RADAR COUNTS

Observer: S. BAIRD
Date: Day: 06 Month: 08 19: 92
Time: (24 hr clock): 800
Windspeed (knots/hr):
Amphitrite: E 03 Estevan: NW 08

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	1
53	2
Total	3
Area 23	
Sub 55 (7 & 12 mile)	2
57 (20 mile)	11
58 (South Bank)	38
59 (Big Bank)	4
113 (Finger Bank)	6
Total	61
Area 24	
Sub 60 (La Perouse)	66
61	4
62 (Portland Pt)	65
63	1
64 (Estevan Pt)	12
65	2
Total	150
Total for SWTR	214

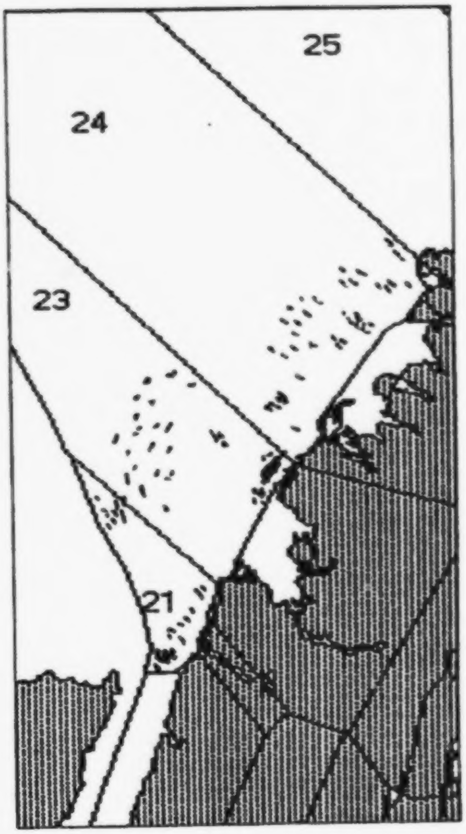


Comments: FOGGY

UCLUELET RADAR COUNTS

Observer: S BAIRD
Date: Day: 07 Month: 08 19: 92
Time: (24 hr clock): 800
Windspeed (knots/hr):
Amphitrite: W 03 Estevan: E 07

Estimated Number of Boats:



Area 21	
Sub 52 (Swiftsure)	24
53	15
Total	39
Area 23	
Sub 55 (7 & 12 mile)	7
57 (20 mile)	17
58 (South Bank)	47
59 (Big Bank)	14
113 (Finger Bank)	7
Total	92
Area 24	
Sub 60 (La Perouse)	76
61	3
62 (Portland Pt)	81
63	2
64 (Estevan Pt)	19
65	1
Total	182
Total for SWTR	313

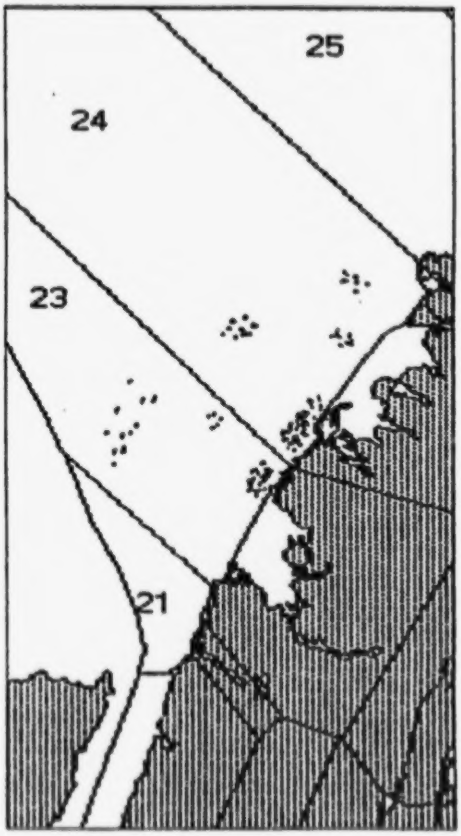
Comments: Overcast

UCLUELET RADAR COUNTS

Observer: B. Illerbrun
Date: Day: 08 Month: 08 19: 92
Time: (24 hr clock): 0800
Windspeed (knots/hr):
Amphitrite: SE 10 Estevan: SE 8

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	6
53	20
Total	26
Area 23	
Sub 55 (7 & 12 mile)	10
57 (20 mile)	16
58 (South Bank)	23
59 (Big Bank)	8
113 (Finger Bank)	6
Total	63
Area 24	
Sub 60 (La Perouse)	68
61	3
62 (Portland Pt)	35
63	0
64 (Estevan Pt)	7
65	5
Total	118
Total for SWTR	207



Comments: Some morning fog mixed with low cloud and drizzle

UCLUELET RADAR COUNTS

Observer: Barbara Illerbrun
Date: Day: 09 **Month:** 08 **19:** 92
Time: (24 hr clock): 0800
Windspeed (knots/hr):
Amphitrite: E7 **Estevan:** E6

Estimated Number of Boats:

Area 21

Sub 52 (Swiftsure)	22
53	12
Total	34

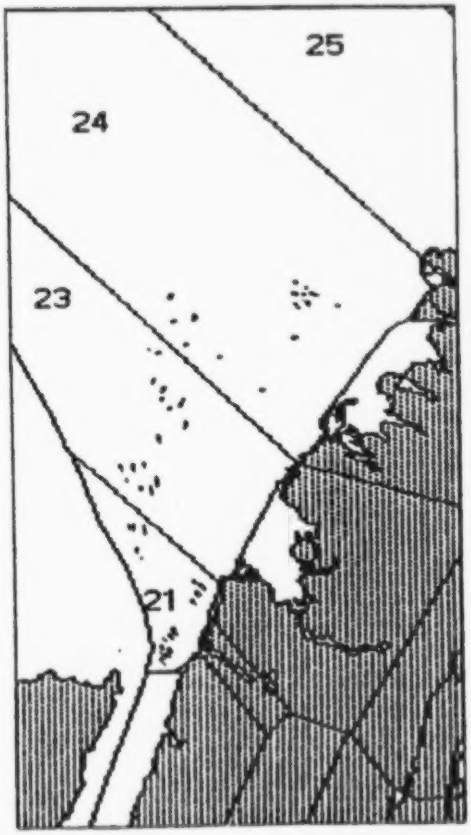
Area 23

Sub 55 (7 & 12 mile)	~~30~~ 24
57 (20 mile)	~~4~~ 2
58 (South Bank)	16
59 (Big Bank)	6
113 (Finger Bank)	1
Total	49

Area 24

Sub 60 (La Perouse)	12
61	5
62 (Portland Pt)	20
63	0
64 (Estevan Pt)	4
65	0
Total	41

Total for SWTR 124



Comments: Cloudy

UCLUELET RADAR COUNTS

Observer: S. BAIRD
Date: Day: 10 Month: 08 19: 92
Time: (24 hr clock): 800
Windspeed (knots/hr):
Amphitrite: calm Estevan: calm

Estimated Number of Boats:

Area 21

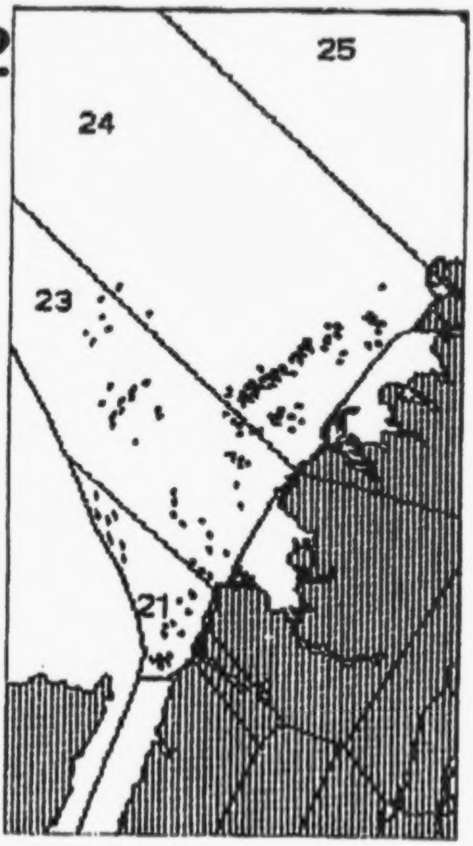
Sub 52 (Swiftsure)	18
53	~~27~~ KN?
Total	~~45~~ 18

Area 23

Sub 55 (7 & 12 mile)	10
57 (20 mile)	24
58 (South Bank)	34
59 (Big Bank)	4
113 (Finger Bank)	5
Total	77

Area 24

Sub 60 (La Perouse)	46
61	12
62 (Portland Pt)	78
63	–
64 (Estevan Pt)	–
65	1
Total	137



Total for SWTR ~~259~~ 232

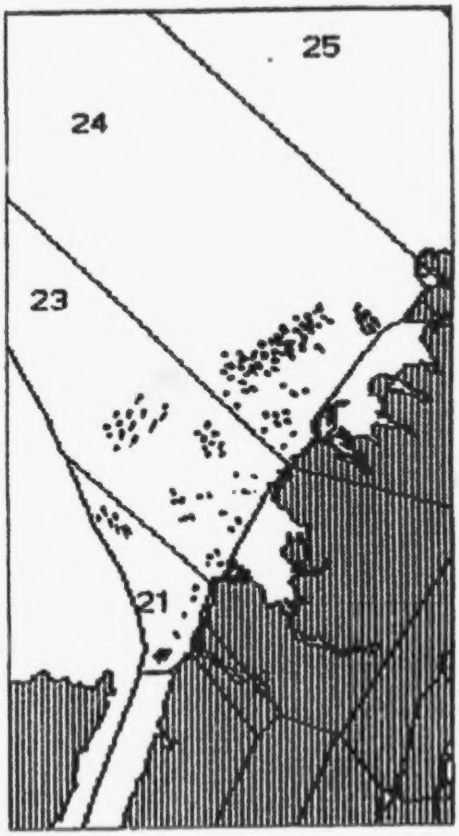
Comments: SUNNY

UCLUELET RADAR COUNTS

Observer: S BAIRD
Date: Day: 11 Month: 08 19: 92
Time: (24 hr clock): 800
Windspeed (knots/hr):
Amphitrite: calm Estevan: NW 12

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	~~21~~ [illegible]
53	18
Total	~~[illegible]~~ 18 [illegible] [illegible]
Area 23	
Sub 55 (7 & 12 mile)	12
57 (20 mile)	28
58 (South Bank)	49
59 (Big Bank)	9
113 (Finger Bank)	2
Total	100
Area 24	
Sub 60 (La Perouse)	68
61	7
62 (Portland Pt)	91
63	—
64 (Estevan Pt)	1
65	—
Total	167
Total for SWTR	~~[illegible]~~ ~~[illegible]~~ 285 285



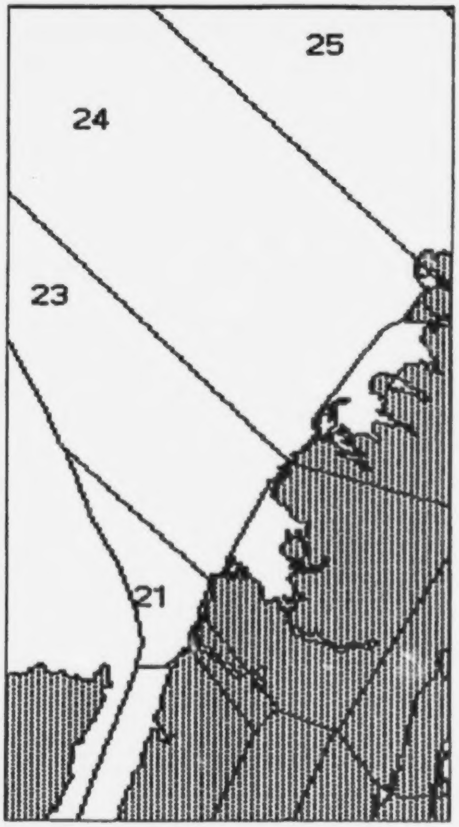
Comments: SUNNY - Some high cloud

UCLUELET RADAR COUNTS

Observer: S. BAIRD
Date: Day: 12 Month: 08 19: 92
Time: (24 hr clock): 800
Windspeed (knots/hr):
Amphitrite: calm Estevan: NW 14

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	16
53	26
Total	42
Area 23	
Sub 55 (7 & 12 mile)	19
57 (20 mile)	21
58 (South Bank)	47
59 (Big Bank)	15
113 (Finger Bank)	8
Total	110
Area 24	
Sub 60 (La Perouse)	67
61	19
62 (Portland Pt)	77
63	7
64 (Estevan Pt)	11
65	3
Total	184
Total for SWTR	336



Comments:

UCLUELET RADAR COUNTS

Observer: S. BAIRD

Date: Day: 13 **Month:** 08 **19:** 92

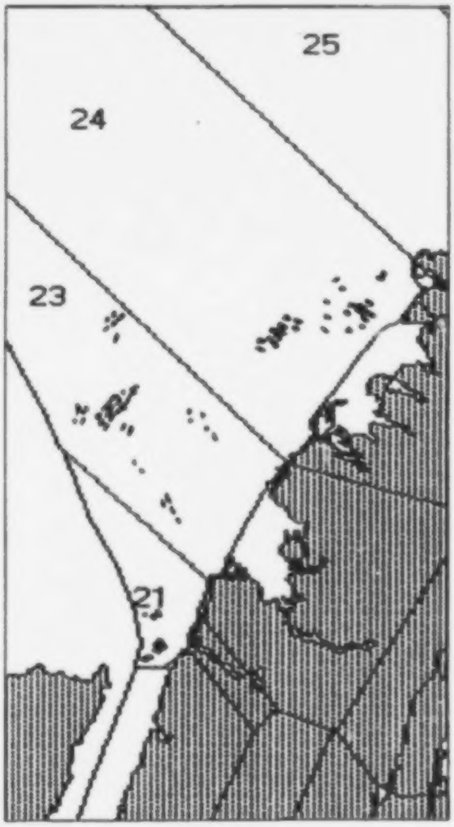
Time: (24 hr clock): 800

Windspeed (knots/hr):

Amphitrite: SE 12 **Estevan:** calm

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	33
53	[illegible] 23
Total	[illegible] 56
Area 23	
Sub 55 (7 & 12 mile)	9
57 (20 mile)	40
58 (South Bank)	37
59 (Big Bank)	10
113 (Finger Bank)	–
Total	96
Area 24	
Sub 60 (La Perouse)	36
61	6
62 (Portland Pt)	75
63	1
64 (Estevan Pt)	12
65	5
Total	135
Total for SWTR	287



Comments: SUNNY – SOME HIGH CLOUD

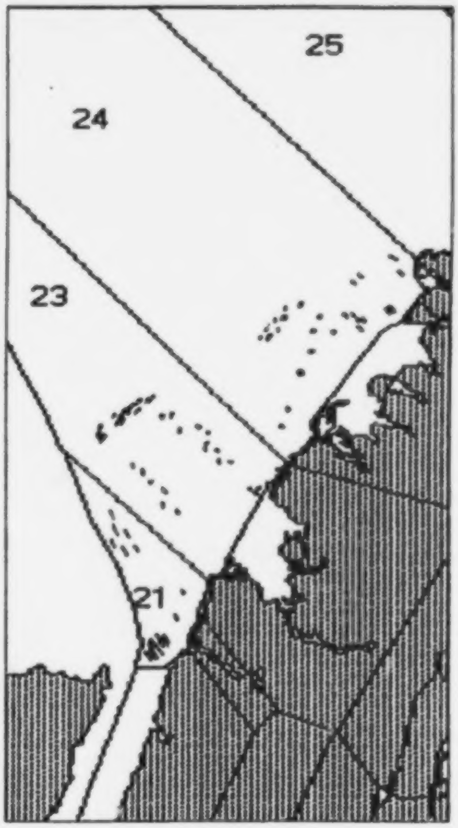
JOT 1991

UCLUELET RADAR COUNTS

Observer: S. BAIRD
Date: Day: 14 Month: 08 19: 92
Time: (24 hr clock): 800
Windspeed (knots/hr):
Amphitrite: SE 03 Estevan: NW 14

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	28
53	15
Total	43
Area 23	
Sub 55 (7 & 12 mile)	10
57 (20 mile)	34
58 (South Bank)	36
59 (Big Bank)	4
113 (Finger Bank)	7
Total	91
Area 24	
Sub 60 (La Perouse)	29
61	3
62 (Portland Pt)	70
63	4
64 (Estevan Pt)	11
65	1
Total	118
Total for SWTR	252



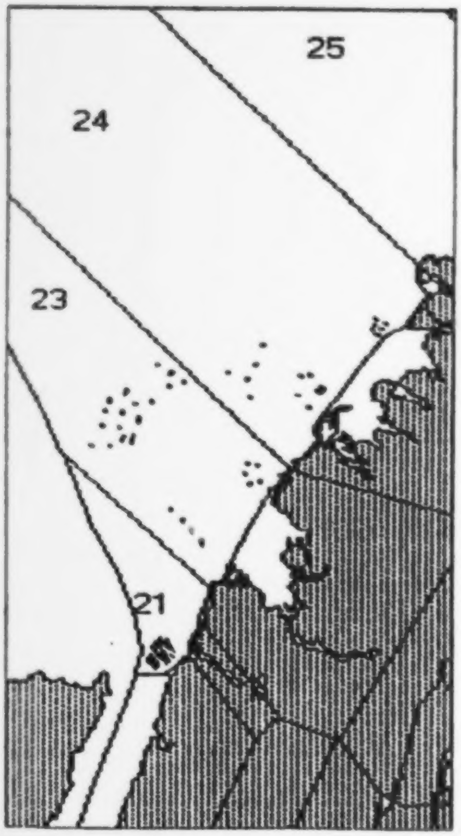
Comments: FOGGY

UCLUELET RADAR COUNTS

Observer: Barbara Illerbrun
Date: Day: 15 **Month:** 08 **19:** 92
Time: (24 hr clock): 0800
Windspeed (knots/hr):
Amphitrite: SE 7 **Estevan:** calm

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	16
53	3
Total	19
Area 23	
Sub 55 (7 & 12 mile)	14
57 (20 mile)	18
58 (South Bank)	26
59 (Big Bank)	4
113 (Finger Bank)	2
Total	64
Area 24	
Sub 60 (La Perouse)	12
61	5
62 (Portland Pt)	14
63	5
64 (Estevan Pt)	2
65	2
Total	40
Total for SWTR	123



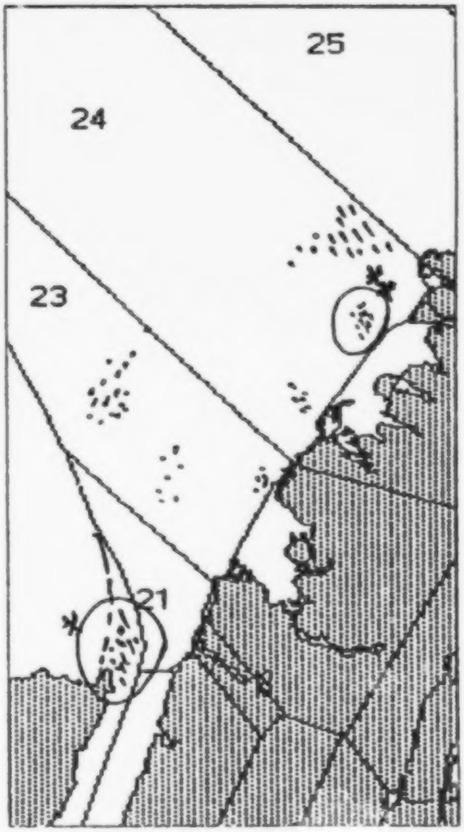
Comments: Considerable sea clutter in area 24 sub 61 and 63. Fog. Note area 21 sub 52.

UCLUELET RADAR COUNTS

Observer: Barbara Illerbrun
Date: Day: 16 Month: 08 19: 92
Time: (24 hr clock): 0800
Windspeed (knots/hr):
Amphitrite: NE calm Estevan: SE calm

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	2
53	10
Total	12
Area 23	
Sub 55 (7 & 12 mile)	5
57 (20 mile)	7
58 (South Bank)	12
59 (Big Bank)	19
113 (Finger Bank)	2
Total	45
Area 24	
Sub 60 (La Perouse)	7
61	5
62 (Portland Pt)	20 **
63	2
64 (Estevan Pt)	20
65	4
Total	58
Total for SWTR	115

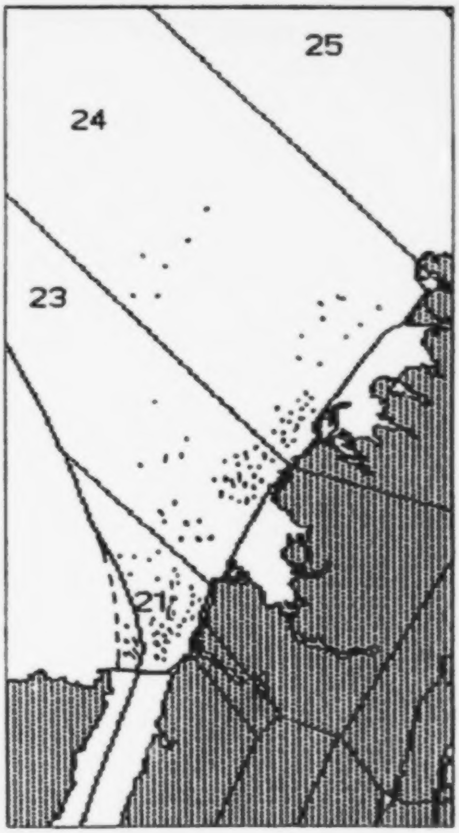


Comments: * approx. 20 vessels as marked.
** 10 sport fishing vessels (?).
FOG

UCLUELET RADAR COUNTS

Observer: Barbara Illerbrun
Date: Day: 17 Month: 08 19: 92
Time: (24 hr clock): 0800
Windspeed (knots/hr):
Amphitrite: SE 4 Estevan: NW 2

Estimated Number of Boats:



Area 21	
Sub 52 (Swiftsure)	80
53	12
Total	92
Area 23	
Sub 55 (7 & 12 mile)	25
57 (20 mile)	24
58 (South Bank)	55
59 (Big Bank)	3
113 (Finger Bank)	0
Total	107
Area 24	
Sub 60 (La Perouse)	30
61	10
62 (Portland Pt)	32
63	10
64 (Estevan Pt)	4
65	2
Total	88
Total for SWTR	287

Comments: Sea clutter in Area 24 sub 61 and 63.
Sub(24 area) sport fishing vessels?]
Sunny / Clear

83

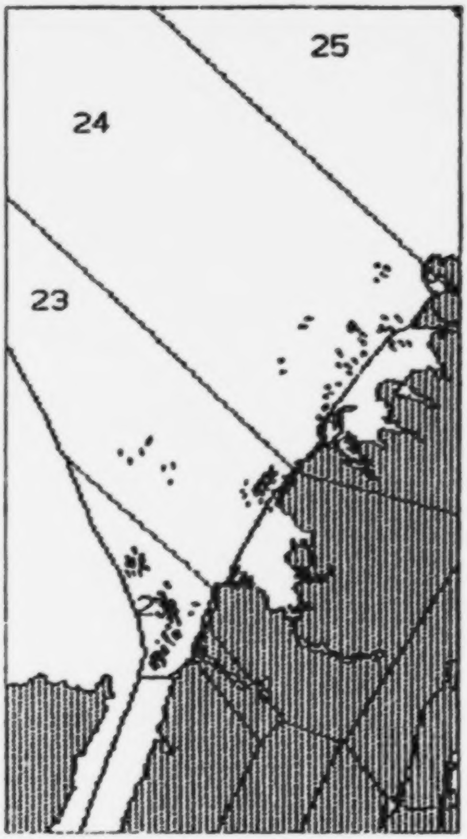
RAD1808(1)

UCLUELET RADAR COUNTS

Observer: S. BAIRD
Date: Day: 18 Month: 08 19: 92
Time: (24 hr clock): 800
Windspeed (knots/hr):
Amphitrite: SE 12 Estevan: SE04

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	125
53	5
Total	130
Area 23	
Sub 55 (7 & 12 mile)	9
57 (20 mile)	7
58 (South Bank)	28
59 (Big Bank)	6
113 (Finger Bank)	2
Total	52
Area 24	
Sub 60 (La Perouse)	89
61	–
62 (Portland Pt)	60
63	–
64 (Estevan Pt)	10
65	2
Total	161
Total for SWTR	343



Comments: Overcast- dull

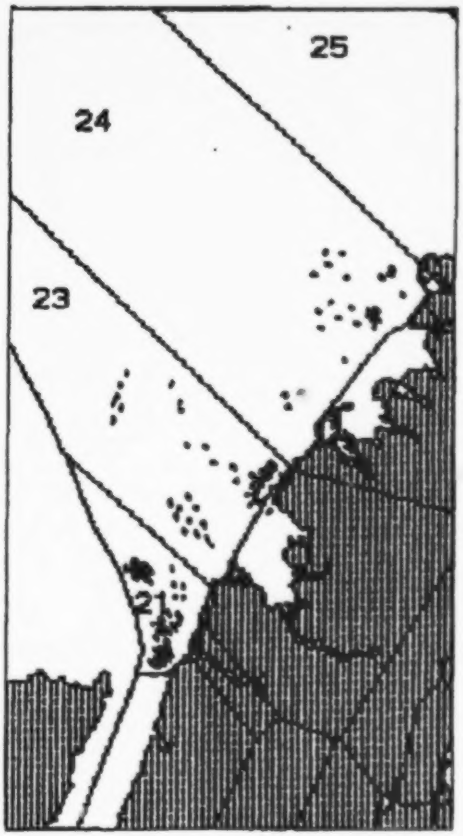
083

RAD1908 (11)

UCLUELET RADAR COUNTS

Observer: S. BAIRD
Date: Day: 19 **Month:** 08 **19:** 92
Time: (24 hr clock): 800
Windspeed (knots/hr): 0 0
Amphitrite: calm **Estevan:** calm

Estimated Number of Boats:



Area 21	
Sub 52 (Swiftsure)	128
53	5
Total	133
Area 23	
Sub 55 (7 & 12 mile)	14
57 (20 mile)	27
58 (South Bank)	43
59 (Big Bank)	3
113 (Finger Bank)	1
Total	88
Area 24	
Sub 60 (La Perouse)	96
61	–
62 (Portland Pt)	53
63	11
64 (Estevan Pt)	12
65	3
Total	175
Total for SWTR	396

Comments: FOGGY - Good deal of sea clutter. Difficult to count boats in area 21 - tend to blur together.

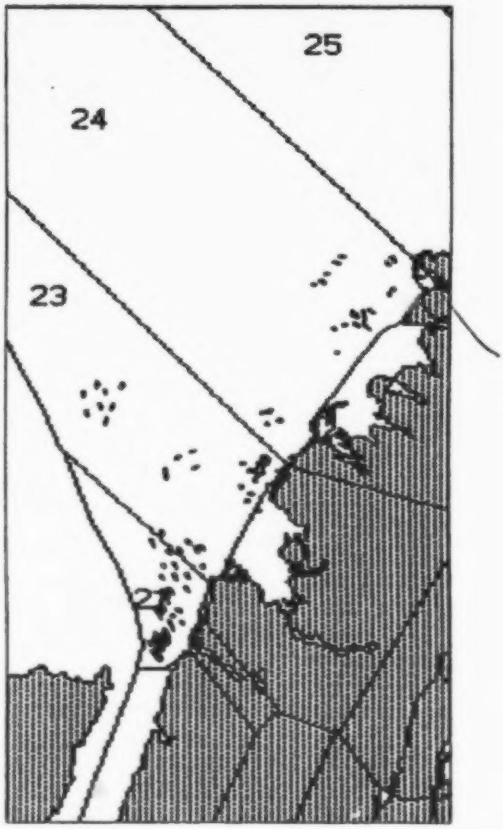
1

UCLUELET RADAR COUNTS

Observer: S. BAIRD
Date: Day: 20 Month: 08 19: 92
Time: (24 hr clock): 800
Windspeed (knots/hr):
Amphitrite: SE 13 Estevan: SE 10

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	120
53	8
Total	128
Area 23	
Sub 55 (7 & 12 mile)	24
57 (20 mile)	18
58 (South Bank)	25
59 (Big Bank)	6
113 (Finger Bank)	8
Total	81
Area 24	
Sub 60 (La Perouse)	64
61	3
62 (Portland Pt)	42
63	2
64 (Estevan Pt)	4
65	3
Total	118
Total for SWTR	327



Comments: FOGGY - OVERCAST SKY

RAD 2108 (1)

UCLUELET RADAR COUNTS

Observer: S. BAIRD
Date: Day: 21 Month: 08 19: 92
Time: (24 hr clock): 800
Windspeed (knots/hr):
Amphitrite: W 04 Estevan: S 05

Estimated Number of Boats:

Area 21

Sub 52 (Swiftsure)	17
53	7
Total	24

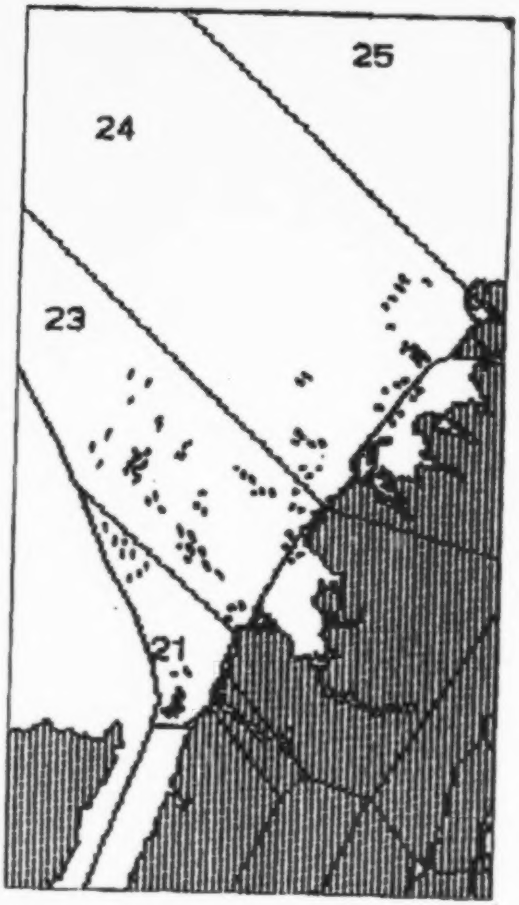
Area 23

Sub 55 (7 & 12 mile)	33
57 (20 mile)	38
58 (South Bank)	40
59 (Big Bank)	11
113 (Finger Bank)	9
Total	131

Area 24

Sub 60 (La Perouse)	33
61	1
62 (Portland Pt)	64
63	1
64 (Estevan Pt)	1
65	6
Total	106

Total for SWTR 261



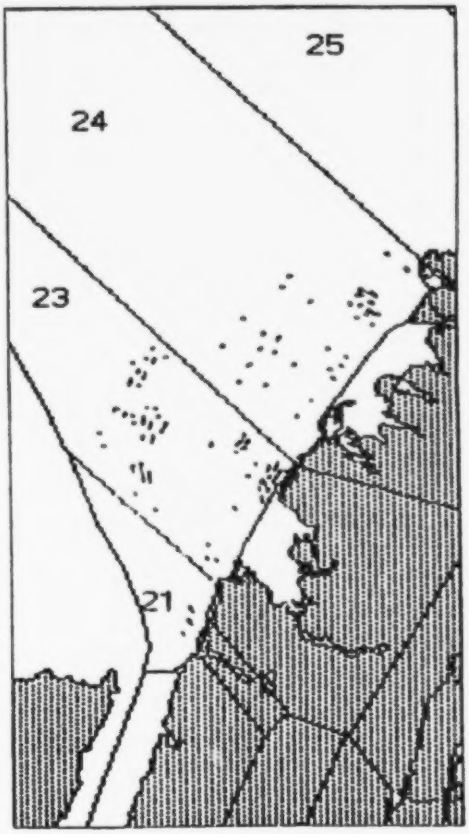
Comments: Overcast

UCLUELET RADAR COUNTS

Observer: Barbara Illerbrun
Date: Day: 22 Month: 08 19: 92
Time: (24 hr clock): 0800
Windspeed (knots/hr):
Amphitrite: NE calm Estevan: S 3

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	7
53	5
Total	12
Area 23	
Sub 55 (7 & 12 mile)	29
57 (20 mile)	19
58 (South Bank)	33
59 (Big Bank)	40
113 (Finger Bank)	2
Total	102
Area 24	
Sub 60 (La Perouse)	28
61	2
62 (Portland Pt)	30
63	0
64 (Estevan Pt)	6
65	5
Total	70
Total for SWTR	184



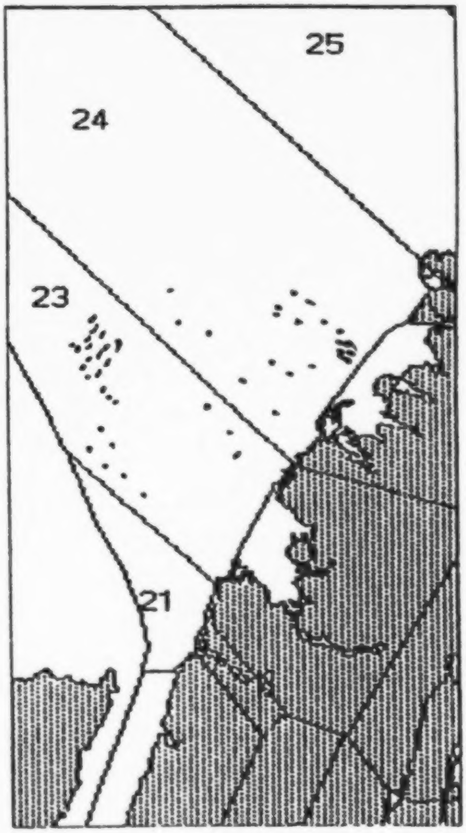
Comments:

UCLUELET RADAR COUNTS

Observer: B. Illerbrun
Date: Day: 23 Month: 08 19: 92
Time: (24 hr clock): 0800
Windspeed (knots/hr):
Amphitrite: E-SE 4 Estevan: E 2

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	1
53	3
Total	4
Area 23	
Sub 55 (7 & 12 mile)	10
57 (20 mile)	5
58 (South Bank)	10
59 (Big Bank)	33
113 (Finger Bank)	2
Total	60
Area 24	
Sub 60 (La Perouse)	18
61	2
62 (Portland Pt)	20
63	0
64 (Estevan Pt)	4
65	2
Total	46
Total for SWTR	110



Comments: Area 24 sub 62 sport fishing vessels ?
Cloudy

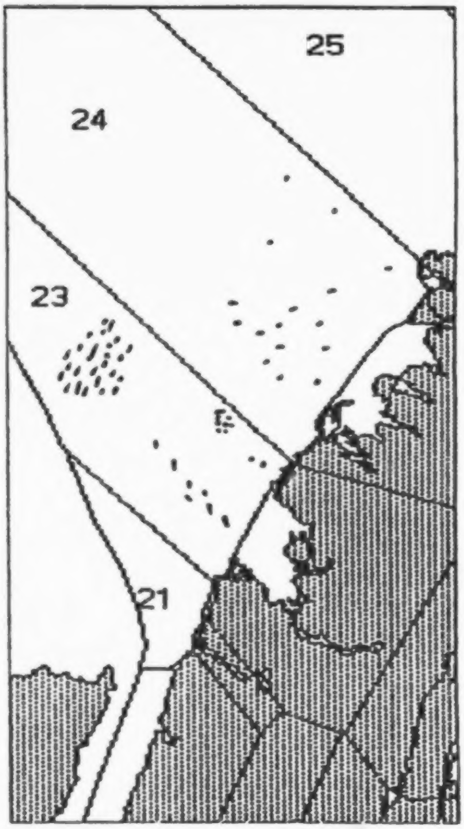
JOT 1991

UCLUELET RADAR COUNTS

Observer: B. Illerbrun
Date: Day: 24 Month: 08 19: 92
Time: (24 hr clock): 0800
Windspeed (knots/hr):
Amphitrite: E calm Estevan: E4

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	2
53	2
Total	4
Area 23	
Sub 55 (7 & 12 mile)	0
57 (20 mile)	10
58 (South Bank)	17
59 (Big Bank)	38
113 (Finger Bank)	1
Total	66
Area 24	
Sub 60 (La Perouse)	16
61	7
62 (Portland Pt)	20
63	0
64 (Estevan Pt)	3
65	4
Total	40
Total for SWTR	110



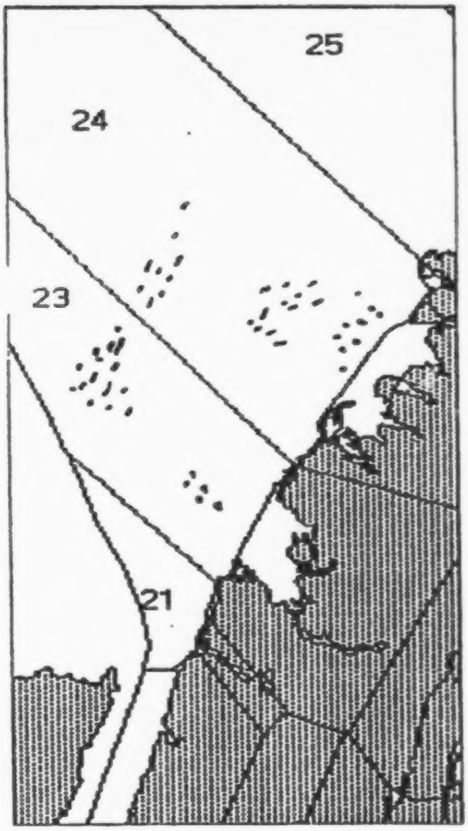
Comments: FOG

UCLUELET RADAR COUNTS

Observer: Barbara Illerbrun
Date: Day: 25 Month: 08 19: 92
Time: (24 hr clock): 0800
Windspeed (knots/hr):
Amphitrite: E 12 Estevan: SW 4

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	0
53	3
Total	3
Area 23	
Sub 55 (7 & 12 mile)	8
57 (20 mile)	16
58 (South Bank)	7
59 (Big Bank)	30
113 (Finger Bank)	2
Total	63
Area 24	
Sub 60 (La Perouse)	3
61	12
62 (Portland Pt)	31
63	3
64 (Estevan Pt)	2
65	3
Total	54
Total for SWTR	120



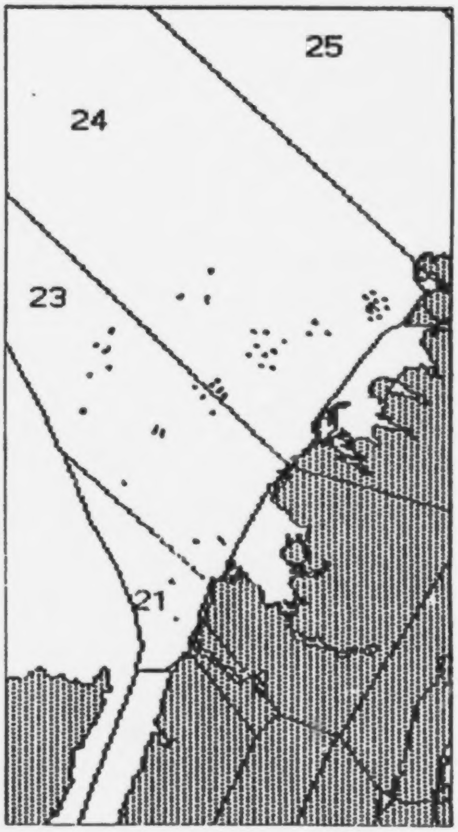
Comments: FOG

UCLUELET RADAR COUNTS

Observer: Barbara Illerbrun
Date: Day: 27 Month: 08 19: 92
Time: (24 hr clock): 0800
Windspeed (knots/hr):
Amphitrite: SE 7 Estevan: E 4

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	4
53	5
Total	9
Area 23	
Sub 55 (7 & 12 mile)	6
57 (20 mile)	3
58 (South Bank)	10
59 (Big Bank)	18
113 (Finger Bank)	3
Total	40
Area 24	
Sub 60 (La Perouse)	4
61	4
62 (Portland Pt)	21
63	2
64 (Estevan Pt)	4
65	0
Total	36
Total for SWTR	85



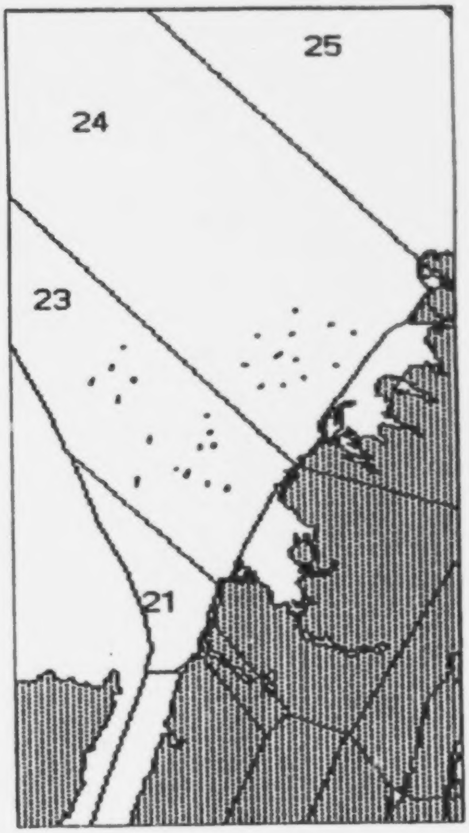
Comments:

UCLUELET RADAR COUNTS

Observer: Barbara Illerbrun
Date: Day: 28 Month: 08 19: 92
Time: (24 hr clock): 0800
Windspeed (knots/hr):
Amphitrite: SW4 Estevan: E3

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	1
53	2
Total	3
Area 23	
Sub 55 (7 & 12 mile)	4
57 (20 mile)	6
58 (South Bank)	12
59 (Big Bank)	6
113 (Finger Bank)	4
Total	32
Area 24	
Sub 60 (La Perouse)	9
61	6
62 (Portland Pt)	17
63	1
64 (Estevan Pt)	3
65	2
Total	38
Total for SWTR	73



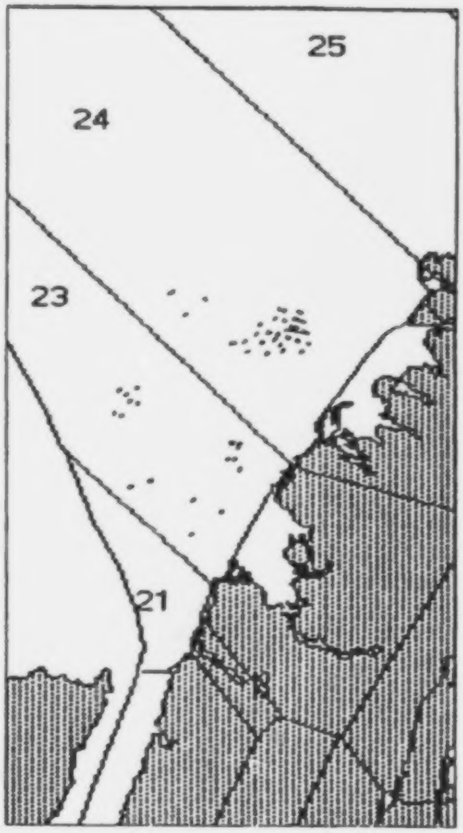
Comments: Somefog

UCLUELET RADAR COUNTS

Observer: Barbara Illerbrun
Date: Day: 29 Month: 08 19: 92
Time: (24 hr clock): 0800
Windspeed (knots/hr):
Amphitrite: N calm Estevan: SE 01

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	4
53	4
Total	8
Area 23	
Sub 55 (7 & 12 mile)	4
57 (20 mile)	8
58 (South Bank)	12
59 (Big Bank)	7
113 (Finger Bank)	0
Total	31
Area 24	
Sub 60 (La Perouse)	7
61	4
62 (Portland Pt)	32
63	1
64 (Estevan Pt)	3
65	1
Total	48
Total for SWTR	87



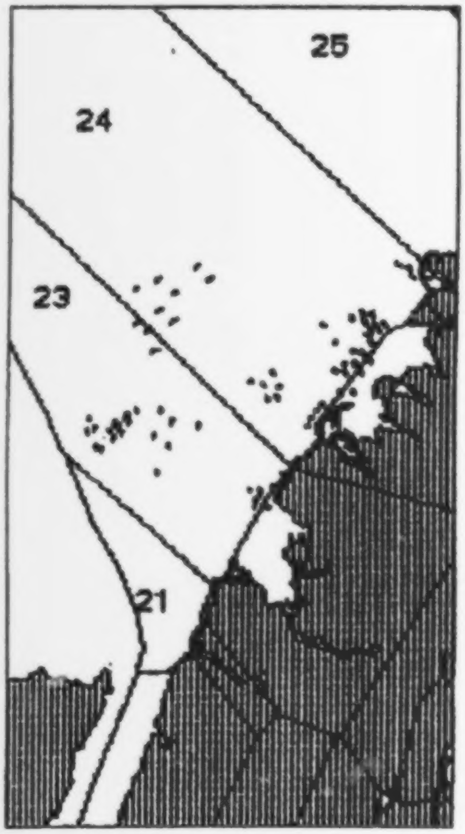
Comments: overcast

UCLUELET RADAR COUNTS

Observer: S. BAIRD
Date: Day: 30 Month: 08 19: 92
Time: (24 hr clock): 800
Windspeed (knots/hr):
Amphitrite: E 10 Estevan: SE 12 G 21

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	–
53	–
Total	–
Area 23	
Sub 55 (7 & 12 mile)	5
57 (20 mile)	21
58 (South Bank)	31
59 (Big Bank)	7
113 (Finger Bank)	6
Total	70
Area 24	
Sub 60 (La Perouse)	7
61	11
62 (Portland Pt)	65
63	–
64 (Estevan Pt)	4
65	1
Total	88
Total for SWTR	158



Comments: RAINING

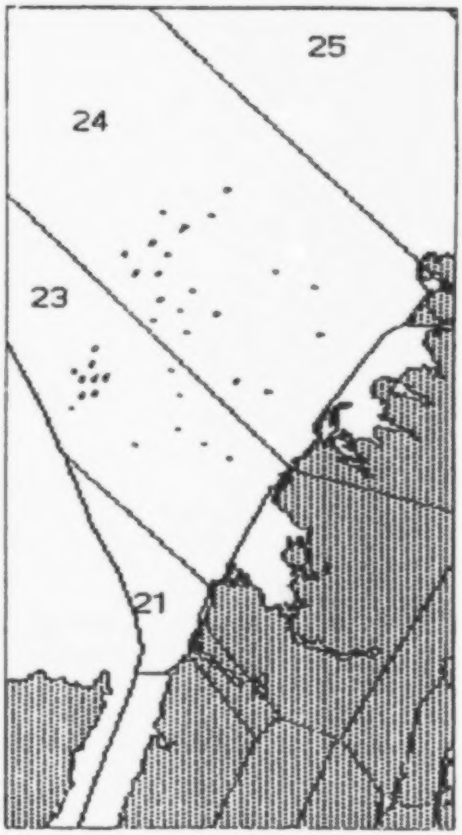
2

UCLUELET RADAR COUNTS

Observer: Barbara Illerbrun
Date: Day: 31 Month: 08 19: 92
Time: (24 hr clock): 0800
Windspeed (knots/hr):
Amphitrite: NW4 Estevan: NW 4

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	2
53	3
Total	5
Area 23	
Sub 55 (7 & 12 mile)	2
57 (20 mile)	4
58 (South Bank)	10
59 (Big Bank)	9
113 (Finger Bank)	3
Total	28
Area 24	
Sub 60 (La Perouse)	20
61	12
62 (Portland Pt)	6
63	2
64 (Estevan Pt)	2
65	1
Total	43
Total for SWTR	76



Comments: Cloud

80

IOT 1991

B
091

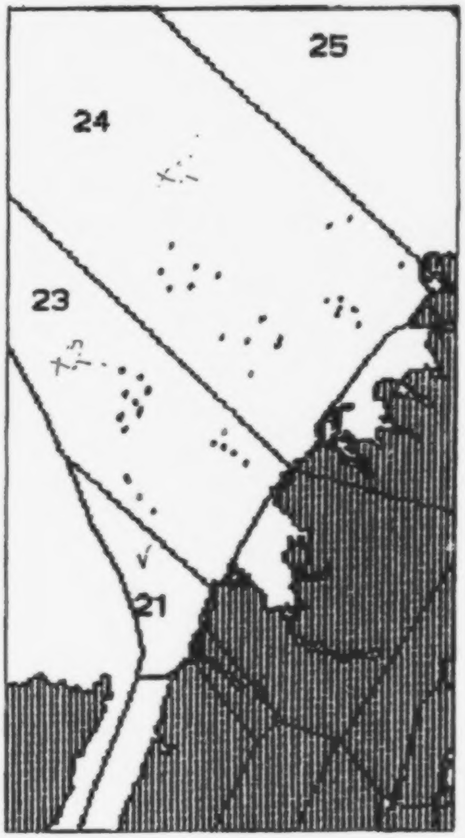
RAD0109(1)

UCLUELET RADAR COUNTS

Observer: Barbara Illerbrun
Date: Day: 1 Month: 09 19: 92
Time: (24 hr clock): 0800
Windspeed (knots/hr):
Amphitrite: SE 3 Estevan: Calm SW

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	0
53	3
Total	3
Area 23	
Sub 55 (7 & 12 mile)	7
57 (20 mile)	13
58 (South Bank)	7
59 (Big Bank)	4
113 (Finger Bank)	2
Total	33
Area 24	
Sub 60 (La Perouse)	6
61	6
62 (Portland Pt)	17
63	4
64 (Estevan Pt)	2
65	2
Total	37
Total for SWTR	73



Comments: Very foggy, limited visibility.

1

UCLUELET RADAR COUNTS

Observer: BARBARA ILLERBRUN
Date: Day: 02 Month: 09 19: 92
Time: (24 hr clock): 0800
Windspeed (knots/hr):
Amphitrite: SE 8 Estevan: Calm

Estimated Number of Boats:

Area 21

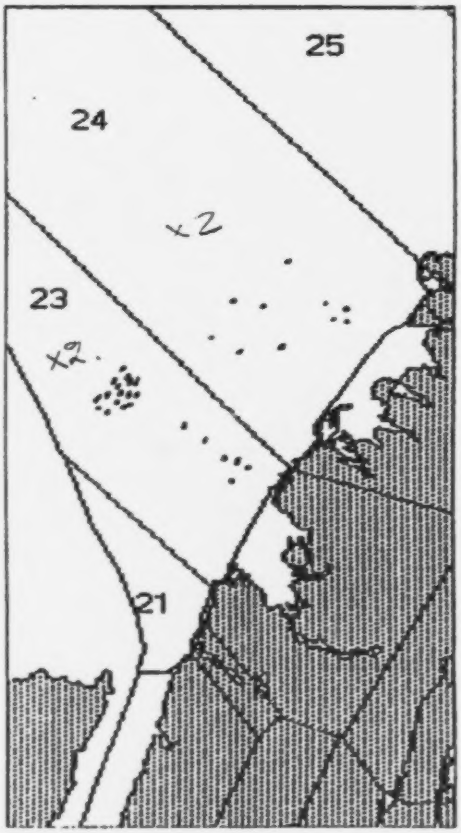
Sub 52 (Swiftsure)	2
53	3
Total	5

Area 23

Sub 55 (7 & 12 mile)	14
57 (20 mile)	16
58 (South Bank)	15
59 (Big Bank)	2
113 (Finger Bank)	0
Total	47

Area 24

Sub 60 (La Perouse)	10
61	3
62 (Portland Pt)	9
63	1
64 (Estevan Pt)	2
65	3
Total	28



Total for SWTR 80

Comments: FOG AND MIST
MANY LARGE VESSELS IN AREA 21, 23 and 24.

RAD0309(1)

UCLUELET RADAR COUNTS

Observer: S. BAIRD
Date: Day: 03 Month: 09 19: 92
Time: (24 hr clock): 800
Windspeed (knots/hr):
Amphitrite: NW 07 Estevan: NW 09

Estimated Number of Boats:

Area 21

Sub 52 (Swiftsure)	3
53	1
Total	4

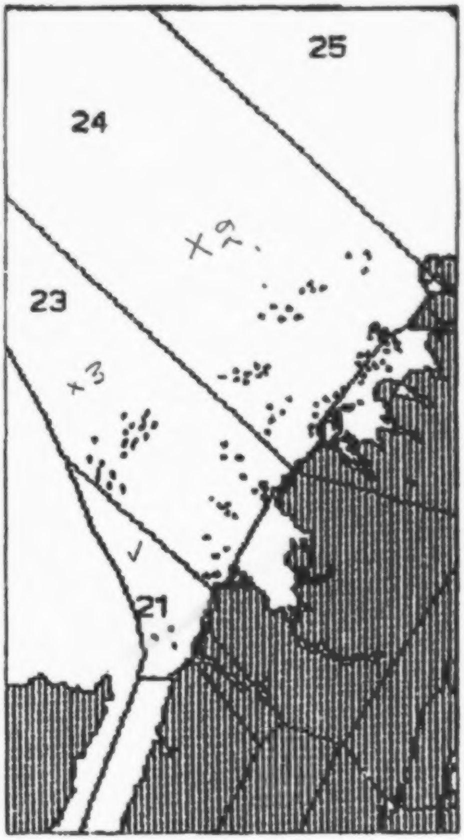
Area 23

Sub 55 (7 & 12 mile)	13
57 (20 mile)	21
58 (South Bank)	45
59 (Big Bank)	10
113 (Finger Bank)	4
Total	93

Area 24

Sub 60 (La Perouse)	39
61	2
62 (Portland Pt)	63
63	5
64 (Estevan Pt)	4
65	3
Total	116

Total for SWTR 213



Comments: FOG OVER WATER

Al

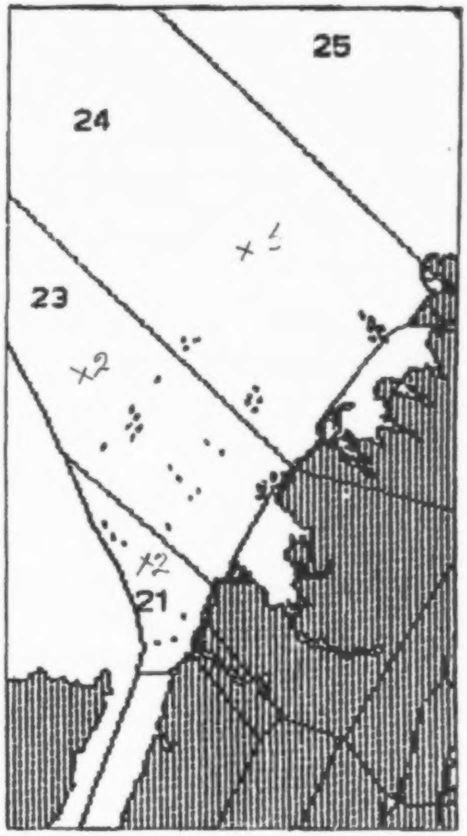
RAD0409(1)

UCLUELET RADAR COUNTS

Observer: S BAIRD
Date: Day: 04 Month: 09 19: 92
Time: (24 hr clock): 800
Windspeed (knots/hr):
Amphitrite: NW 12 G16 Estevan: NW 20

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	4
53	8
Total	12
Area 23	
Sub 55 (7 & 12 mile)	7
57 (20 mile)	11
58 (South Bank)	17
59 (Big Bank)	7
113 (Finger Bank)	2
Total	44
Area 24	
Sub 60 (La Perouse)	14
61	5
62 (Portland Pt)	28
63	1
64 (Estevan Pt)	4
65	2
Total	54
Total for SWTR	110



Comments: Difficult to see boats clearly today. Not an accurate count.
Sunny

JOT 1091

92

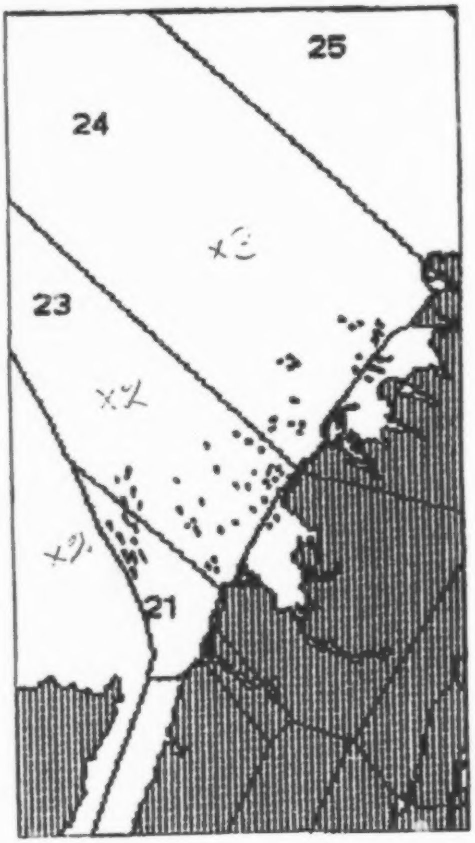
RAD0809(4)

UCLUELET RADAR COUNTS

Observer: S. BAIRD
Date: Day: 05 Month: 09 19: 92
Time: (24 hr clock): 800
Windspeed (knots/hr):
Amphitrite: calm Estevan: NW 05

Estimated Number of Boats:

Area 21		
Sub 52	(Swiftsure)	6
53		14.
Total		20
Area 23		
Sub 55	(7 & 12 mile)	16
57	(20 mile)	20
58	(South Bank)	24
59	(Big Bank)	3
113	(Finger Bank)	2
Total		65
Area 24		
Sub 60	(La Perouse)	34
61		–
62	(Portland Pt)	46
63		1
64	(Estevan Pt)	3
65		–
Total		84
Total for SWTR		169



Comments: SUNNY

JOT 1991

UCLUELET RADAR COUNTS

Observer: S BAIRD
Date: Day: 07 Month: 09 19: 92
Time: (24 hr clock): 800
Windspeed (knots/hr):
Amphitrite: SE 11 G 14 Estevan: SE 23 G 34

Estimated Number of Boats:

Area 21

Sub 52 (Swiftsure)	10
53	–
Total	10

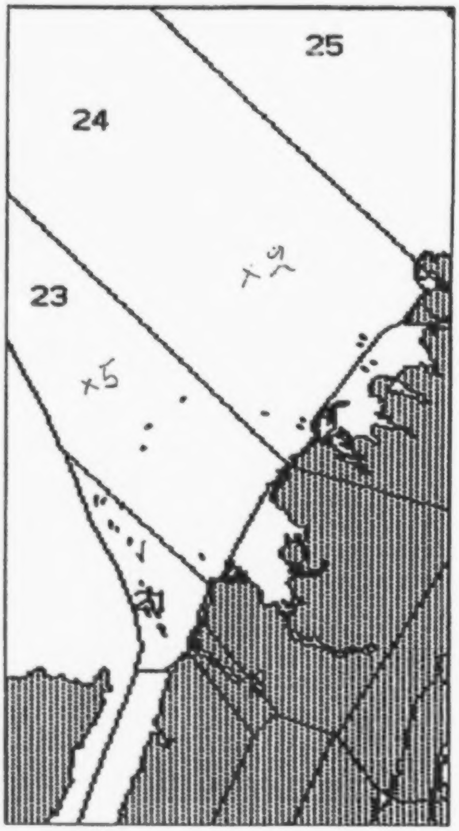
Area 23

Sub 55 (7 & 12 mile)	3
57 (20 mile)	7
58 (South Bank)	6
59 (Big Bank)	2
113 (Finger Bank)	4
Total	22

Area 24

Sub 60 (La Perouse)	3
61	–
62 (Portland Pt)	9
63	–
64 (Estevan Pt)	–
65	–
Total	12

Total for SWTR 44



Comments: RAINING

UCLUELET RADAR COUNTS

Observer: S. BAIRD

Date: Day: 08 Month: 09 19: 92

Time: (24 hr clock): 800

Windspeed (knots/hr):

Amphitrite: Calm Estevan: N. 08

Estimated Number of Boats:

Area 21

Sub 52 (Swiftsure)	23
53	2
Total	25

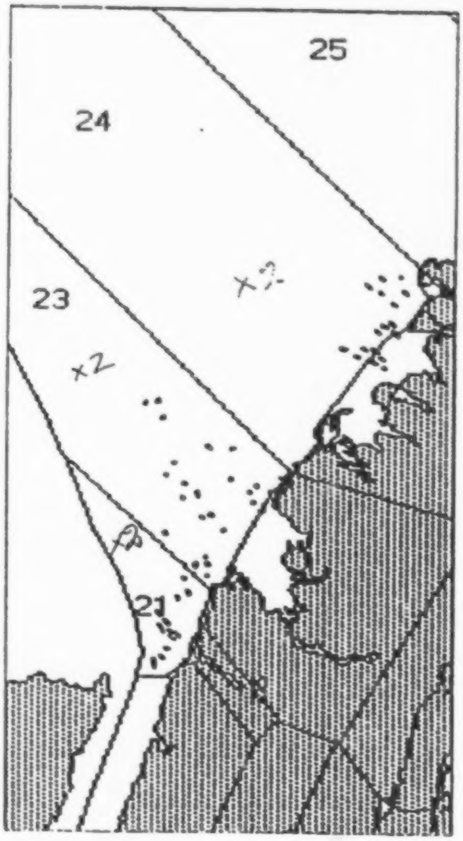
Area 23

Sub 55 (7 & 12 mile)	10
57 (20 mile)	9
58 (South Bank)	14
59 (Big Bank)	–
113 (Finger Bank)	–
Total	33

Area 24

Sub 60 (La Perouse)	12
61	–
62 (Portland Pt)	22
63	–
64 (Estevan Pt)	8
65	–
Total	42

Total for SW1R 100



Comments: SUNNY - FOG OVER WATER IN SOME AREAS.

UCLUELET RADAR COUNTS

Observer: S. BAIRD

Date: Day: 09 Month: 09 19: 92

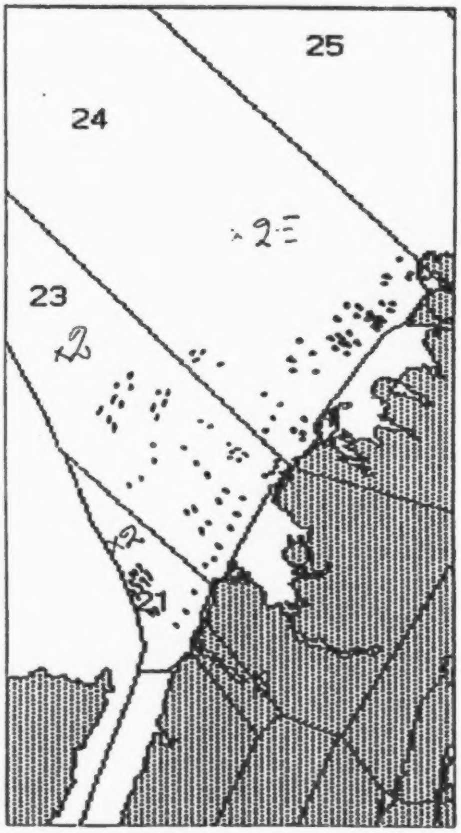
Time: (24 hr clock): 800

Windspeed (knots/hr):

Amphitrite: E. 05 Estevan: E 04

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	23
53	6
Total	29
Area 23	
Sub 55 (7 & 12 mile)	12
57 (20 mile)	28
58 (South Bank)	36
59 (Big Bank)	7
113 (Finger Bank)	–
Total	83
Area 24	
Sub 60 (La Perouse)	17
61	2
62 (Portland Pt)	64
63	1
64 (Estevan Pt)	16
65	2
Total	102
Total for SWTR	214



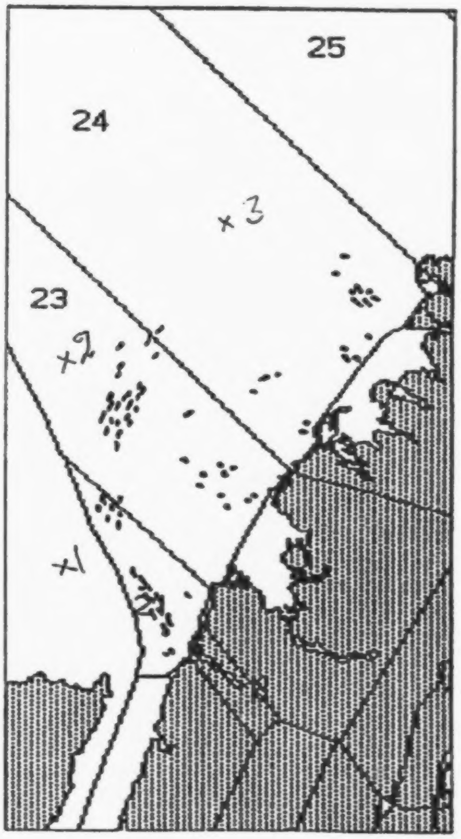
Comments: SUNNY - SOME HIGH CLOUD

UCLUELET RADAR COUNTS

Observer: S BAIRD
Date: Day: 10 Month: 09 19: 92
Time: (24 hr clock): 800
Windspeed (knots/hr):
Amphitrite: NW. 05 Estevan: NW 19

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	22
53	4
Total	26
Area 23	
Sub 55 (7 & 12 mile)	3
57 (20 mile)	19
58 (South Bank)	26
59 (Big Bank)	32
113 (Finger Bank)	4
Total	84
Area 24	
Sub 60 (La Perouse)	22
61	5
62 (Portland Pt)	20
63	–
64 (Estevan Pt)	12
65	4
Total	63
Total for SWTR	173



Comments: FOG OVER WATER

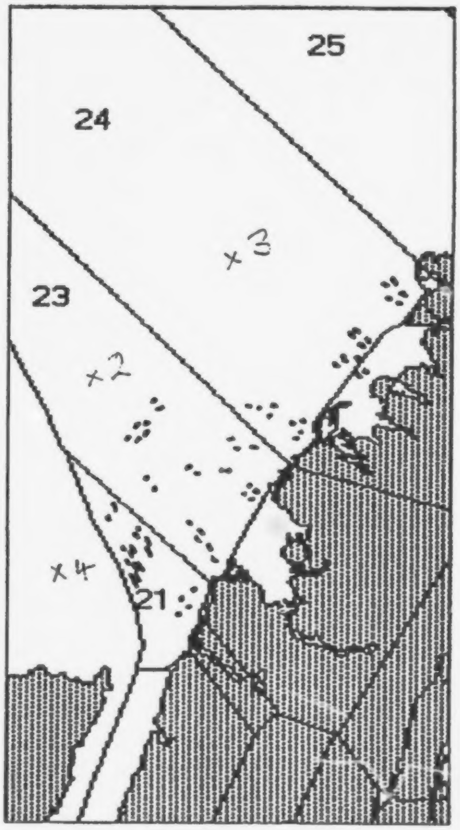
JOT 1991

UCLUELET RADAR COUNTS

Observer: S BAIRD
Date: Day: 11 Month: 09 19: 92
Time: (24 hr clock): 800
Windspeed (knots/hr):
Amphitrite: SE 09 Estevan: NW 20

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	48
53	23
Total	71
Area 23	
Sub 55 (7 & 12 mile)	11
57 (20 mile)	8
58 (South Bank)	16
59 (Big Bank)	15
113 (Finger Bank)	2
Total	52
Area 24	
Sub 60 (La Perouse)	15
61	–
62 (Portland Pt)	45
63	–
64 (Estevan Pt)	8
65	1
Total	69
Total for SWTR	192



Comments: CLOUDY

192 (1)
093 (2)

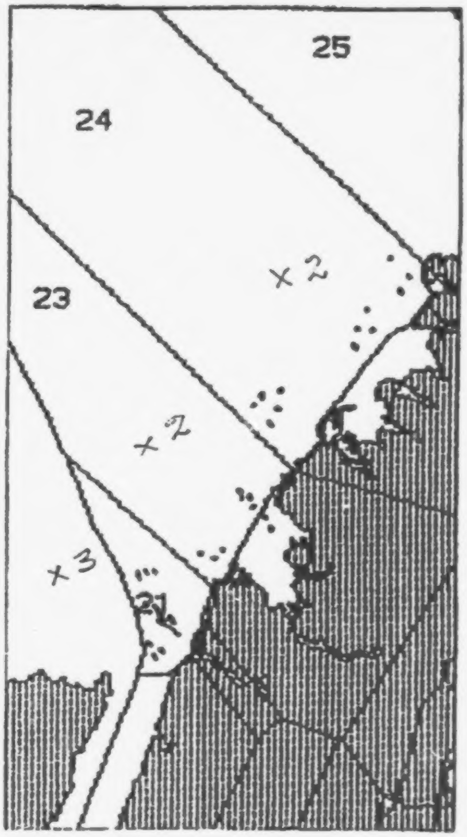
RAD1409 (3)

UCLUELET RADAR COUNTS

Observer: S. BAIRD
Date: Day: 12 Month: 09 19: 0992
Time: (24 hr clock): 800
Windspeed (knots/hr):
Amphitrite: NW 08 Estevan: NW 21

Estimated Number of Boats:

Area 21		
Sub 52	**(Swiftsure)**	27
53		6
	Total	33
Area 23		
Sub 55	**(7 & 12 mile)**	4
57	**(20 mile)**	–
58	**(South Bank)**	8
59	**(Big Bank)**	–
113	**(Finger Bank)**	–
	Total	12
Area 24		
Sub 60	**(La Perouse)**	15
61		–
62	**(Portland Pt)**	7
63		
64	**(Estevan Pt)**	4
65		–
	Total	26
Total for SWTR		71



Comments: Sunny – Gale warnings.

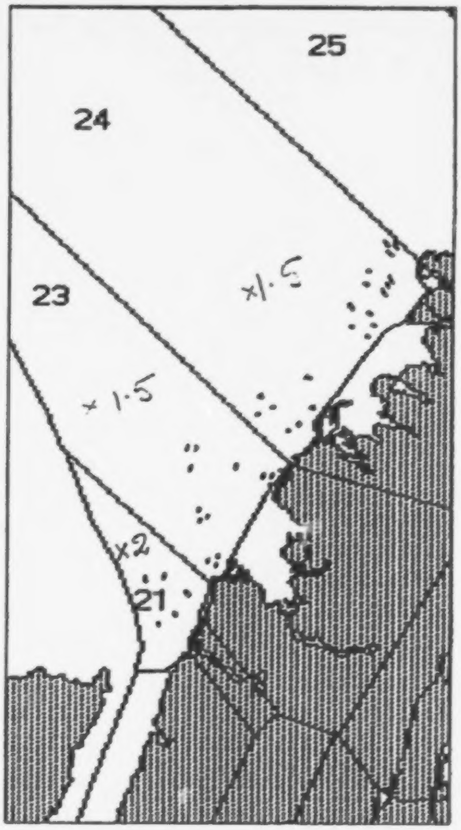
1

UCLUELET RADAR COUNTS

Observer: S BAIRD
Date: Day: 13 Month: 09 19: 92
Time: (24 hr clock): 800
Windspeed (knots/hr):
Amphitrite: NW 03 Estevan: N. 02

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	11
53	2
Total	13
Area 23	
Sub 55 (7 & 12 mile)	7
57 (20 mile)	4
58 (South Bank)	6
59 (Big Bank)	–
113 (Finger Bank)	1
Total	18
Area 24	
Sub 60 (La Perouse)	3
61	–
62 (Portland Pt)	16
63	–
64 (Estevan Pt)	10
65	–
Total	29
Total for SWTR	60



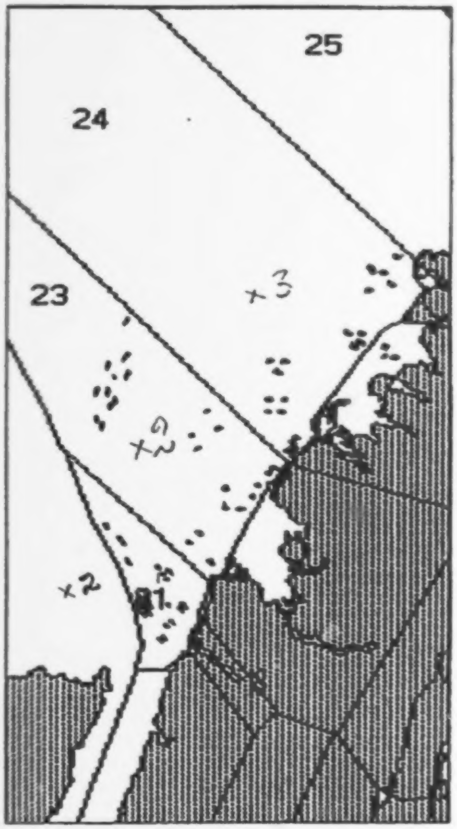
Comments: CLEAR SKIES

UCLUELET RADAR COUNTS

Observer: S. BAIRD
Date: Day: 14 Month: 09 19: 92
Time: (24 hr clock): 800
Windspeed (knots/hr):
Amphitrite: calm Estevan: N.04

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	34
53	6
Total	40
Area 23	
Sub 55 (7 & 12 mile)	5
57 (20 mile)	11
58 (South Bank)	19
59 (Big Bank)	8
113 (Finger Bank)	3
Total	46
Area 24	
Sub 60 (La Perouse)	23
61	5
62 (Portland Pt)	40
63	1
64 (Estevan Pt)	5
65	3
Total	77
Total for SWTR	163



Comments: SUNNY

UCLUELET RADAR COUNTS

Observer: S. BAIRD
Date: Day: 15 Month: 09 19: 92
Time: (24 hr clock): 800
Windspeed (knots/hr):
Amphitrite: calm Estevan: SE 04

Estimated Number of Boats:

Area 21

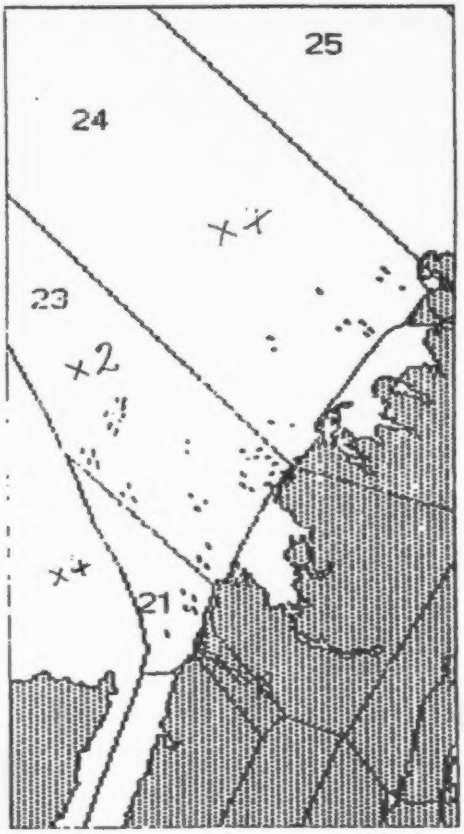
Sub 52 (Swiftsure)	18
53	3
Total	21

Area 23

Sub 55 (7 & 12 mile)	9
57 (20 mile)	16
58 (South Bank)	19
59 (Big Bank)	11
113 (Finger Bank)	1
Total	56

Area 24

Sub 60 (La Perouse)	19
61	2
62 (Portland Pt)	27
63	3
64 (Estevan Pt)	3
65	--
Total	54



Total for SWTR 131

Comments: Sunny

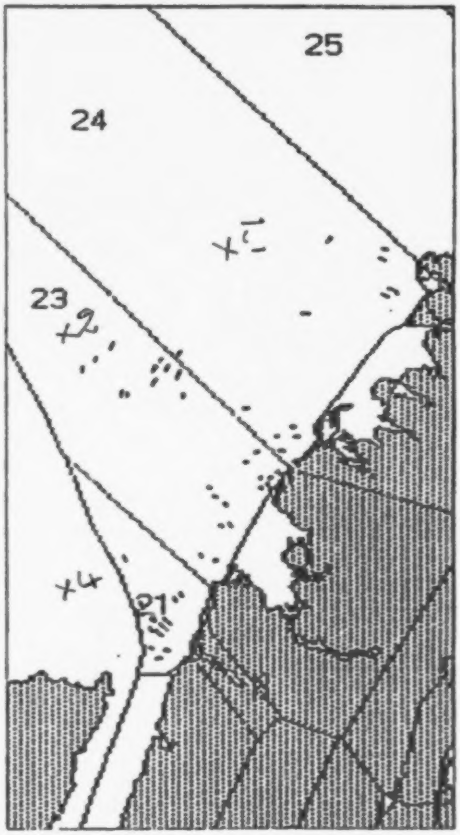
JOT 1991

UCLUELET RADAR COUNTS

Observer: S BAIRD
Date: Day: 16 Month: 09 19: 92
Time: (24 hr clock): 800
Windspeed (knots/hr):
Amphitrite: N 02 Estevan: SE 03

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	35
53	4
Total	39
Area 23	
Sub 55 (7 & 12 mile)	4
57 (20 mile)	12
58 (South Bank)	29
59 (Big Bank)	12
113 (Finger Bank)	1
Total	58
Area 24	
Sub 60 (La Perouse)	23
61	1
62 (Portland Pt)	20
63	1
64 (Estevan Pt)	5
65	1
Total	51
Total for SWTR	148



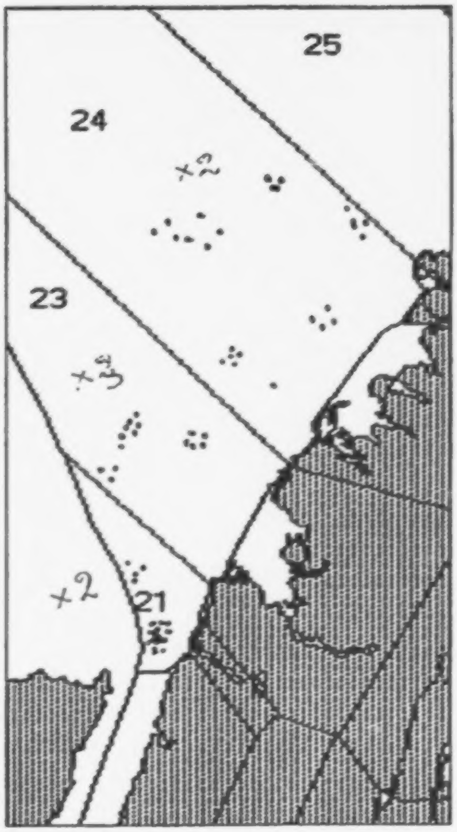
Comments: SUNNY

UCLUELET RADAR COUNTS

Observer: B. Graupensberger
Date: Day: 17 Month: 09 19: 92
Time: (24 hr clock): 8:00
Windspeed (knots/hr):
Amphitrite: 11 SE Estevan: 5 NE

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	25
53	7
Total	32
Area 23	
Sub 55 (7 & 12 mile)	2
57 (20 mile)	7
58 (South Bank)	25
59 (Big Bank)	7
113 (Finger Bank)	0
Total	41
Area 24	
Sub 60 (La Perouse)	7
61	9
62 (Portland Pt)	11
63	2
64 (Estevan Pt)	8
65	4
Total	41
Total for SWTR	114



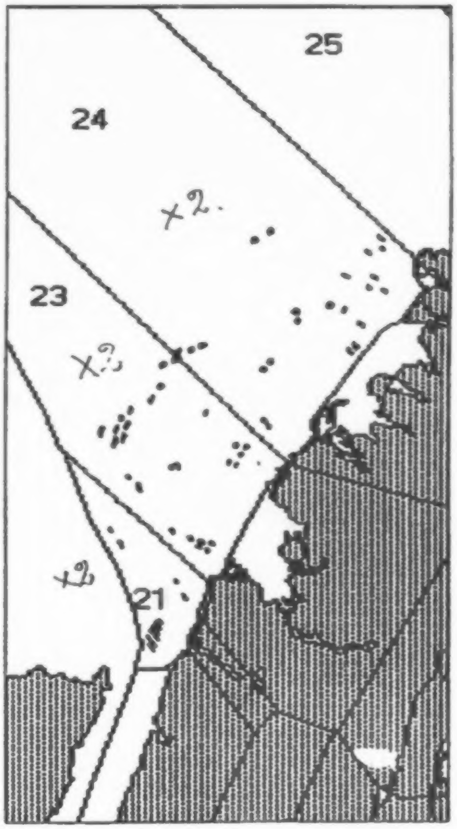
Comments:

UCLUELET RADAR COUNTS

Observer: S. BAIRD
Date: Day: 18 Month: 09 19: 92
Time: (24 hr clock): 800
Windspeed (knots/hr):
Amphitrite: SE 05 Estevan: SE 05

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	21
53	5
Total	26
Area 23	
Sub 55 (7 & 12 mile)	16 [illegible]
57 (20 mile)	15
58 (South Bank)	15
59 (Big Bank)	6
113 (Finger Bank)	2
Total	~~47~~ 54
Area 24	
Sub 60 (La Perouse)	16
61	1
62 (Portland Pt)	28
63	2
64 (Estevan Pt)	14
65	3
Total	64
Total for SWTR	~~137~~ 144



Comments: CLOUDY

UCLUELET RADAR COUNTS

Observer: S BAIRD

Date: Day: 19 Month: 09 19: 92

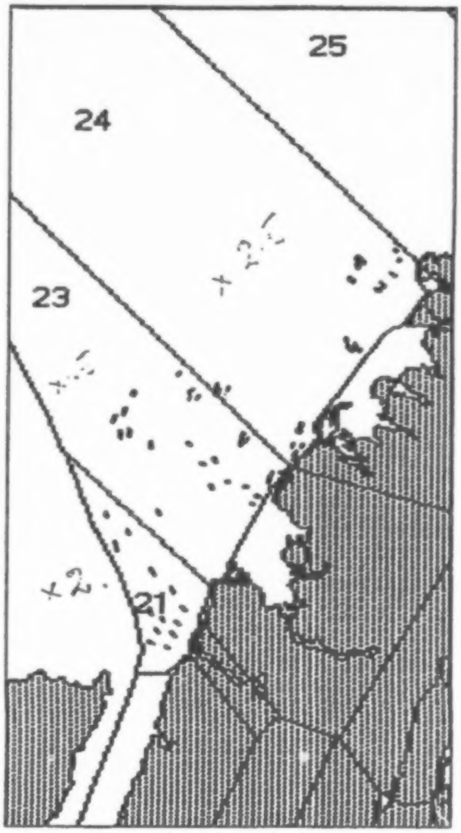
Time: (24 hr clock): 800

Windspeed (knots/hr):

Amphitrite: SE 04 Estevan: SE 05

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	18
53	4
Total	22
Area 23	
Sub 55 (7 & 12 mile)	2
57 (20 mile)	4
58 (South Bank)	15
59 (Big Bank)	5
113 (Finger Bank)	—
Total	26
Area 24	
Sub 60 (La Perouse)	18
61	2
62 (Portland Pt)	24
63	3
64 (Estevan Pt)	9
65	1
Total	57
Total for SWTR	105



Comments: CLOUDY

UCLUELET RADAR COUNTS

Observer: S. BAIRD
Date: Day: 20 Month: 07 19: 92
Time: (24 hr clock): 800
Windspeed (knots/hr):
Amphitrite: SE 04 Estevan SE 03

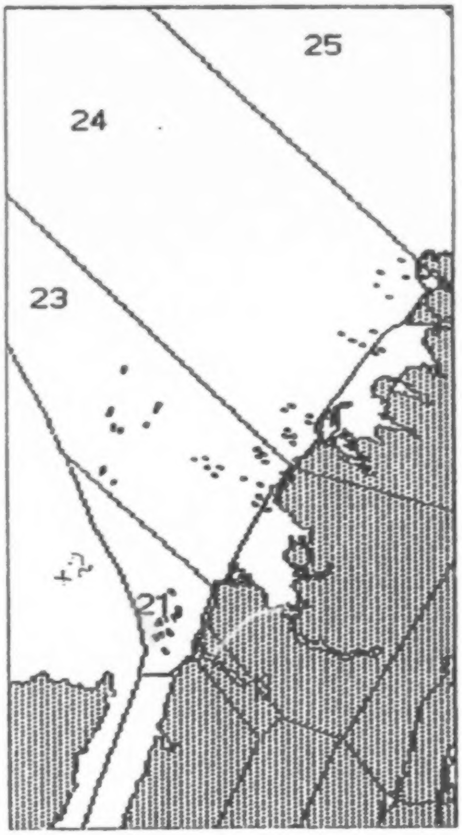
Estimated Number of Boats:

Area 21
Sub 52 (Swiftsure) 18
53 4
Total 22

Area 23
Sub 55 (7 & 12 mile) 2
57 (20 mile) 8
58 (South Bank) 29
59 (Big Bank) 2
113 (Finger Bank) 2
Total 43

Area 24
Sub 60 (La Perouse) 22
61 1
62 (Portland Pt) 27
63 2
64 (Estevan Pt) 6
65 2
Total 60

Total for SWTR 125



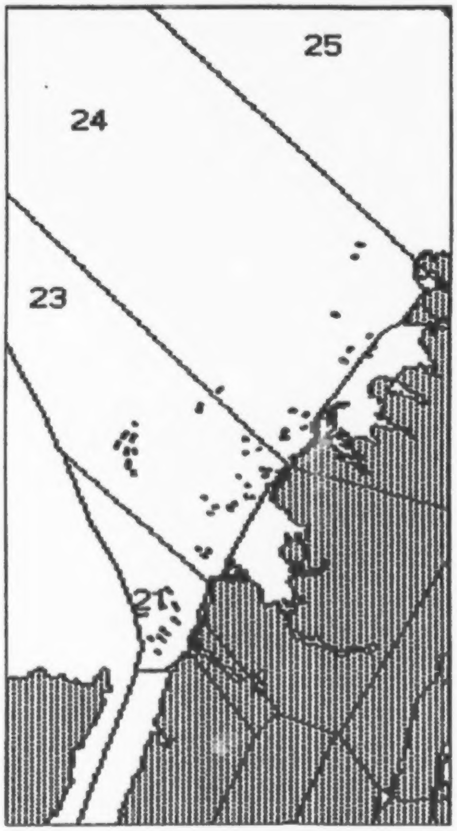
Comments: CLOUDY - LIGHT RAIN
FOG OVER THE WATER

UCLUELET RADAR COUNTS

Observer: S. BAIRD
Date: Day: 21 Month: 09 19: 92
Time: (24 hr clock): 800
Windspeed (knots/hr):
Amphitrite: NW 03 Estevan: calm

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	27
53	–
Total	27
Area 23	
Sub 55 (7 & 12 mile)	7
57 (20 mile)	14
58 (South Bank)	19
59 (Big Bank)	–
113 (Finger Bank)	–
Total	40
Area 24	
Sub 60 (La Perouse)	9
61	–
62 (Portland Pt)	18
63	1
64 (Estevan Pt)	–
65	3
Total	31
Total for SWTR	98



Comments: Overcast
Fog over the water.

94

RAD2209(1)

UCLUELET RADAR COUNTS

Observer: S BAIRD
Date: Day: 22 Month: 09 19: 92
Time: (24 hr clock): 800
Windspeed (knots/hr):
Amphitrite: NW 04 Estevan: calm

Estimated Number of Boats:

Area 21

Sub 52 (Swiftsure)	22
53	3
Total	25

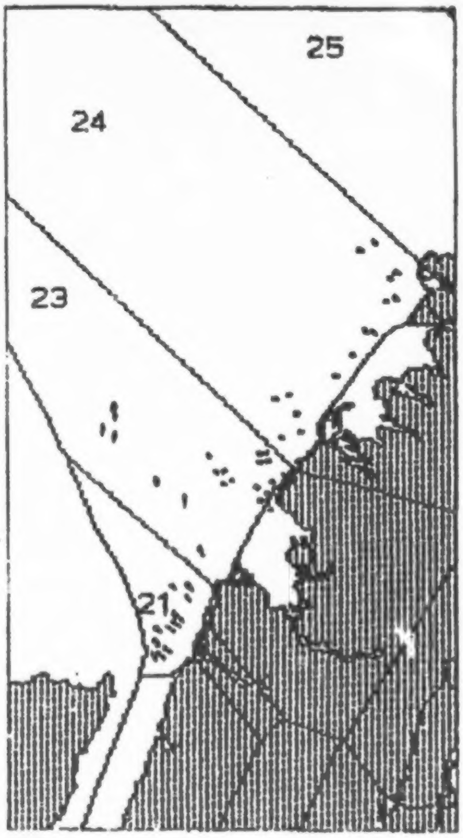
Area 23

Sub 55 (7 & 12 mile)	7
57 (20 mile)	6
58 (South Bank)	~~[illegible]~~ 15
59 (Big Bank)	5
113 (Finger Bank)	—
Total	33

Area 24

Sub 60 (La Perouse)	20
61	1
62 (Portland Pt)	30
63	—
64 (Estevan Pt)	5
65	—
Total	56

Total for SWTR 114



Comments: PARTLY CLOUDY

1

094

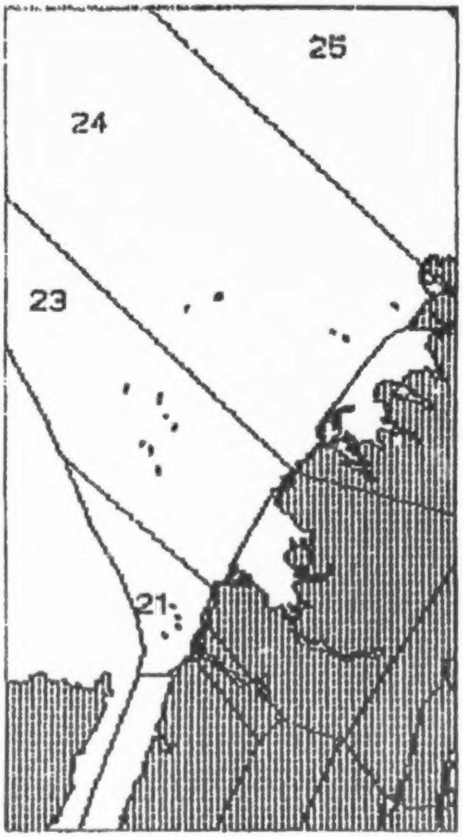
RAD2309(1)

UCLUELET RADAR COUNTS

Observer: S BAIRD
Date: Day: 23 Month: 09 19: 92
Time: (24 hr clock): 800
Windspeed (knots/hr):
Amphitrite: SE 23 Estevan: SE 18 G 25

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	6
53	—
Total	6
Area 23	
Sub 55 (7 & 12 mile)	—
57 (20 mile)	5
58 (South Bank)	3
59 (Big Bank)	3
113 (Finger Bank)	—
Total	11
Area 24	
Sub 60 (La Perouse)	—
61	2
62 (Portland Pt)	3
63	—
64 (Estevan Pt)	1
65	1
Total	7
Total for SWTR	24



Comments: Raining

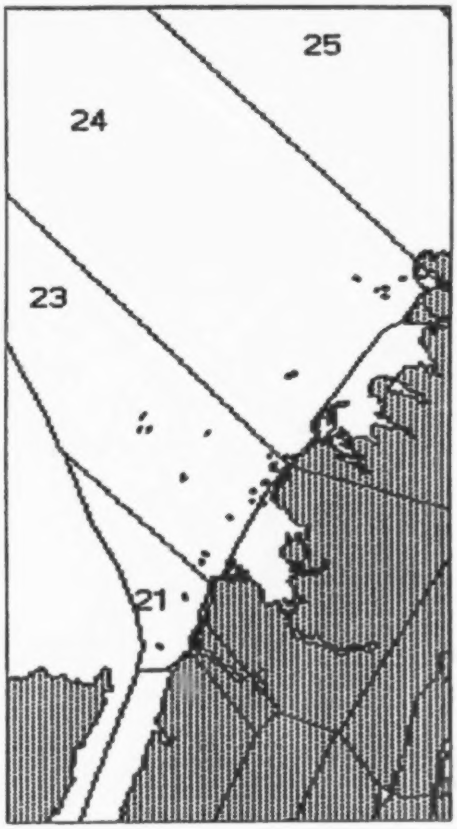
1

UCLUELET RADAR COUNTS

Observer: S BAIRD
Date: Day: 24 Month: 09 19: 92
Time: (24 hr clock): 800
Windspeed (knots/hr):
Amphitrite: NW04 Estevan: NW11

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	3
53	–
Total	3
Area 23	
Sub 55 (7 & 12 mile)	4
57 (20 mile)	2
58 (South Bank)	5
59 (Big Bank)	4
113 (Finger Bank)	1
Total	16
Area 24	
Sub 60 (La Perouse)	5
61	–
62 (Portland Pt)	17
63	–
64 (Estevan Pt)	6
65	1
Total	28
Total for SWTR	47



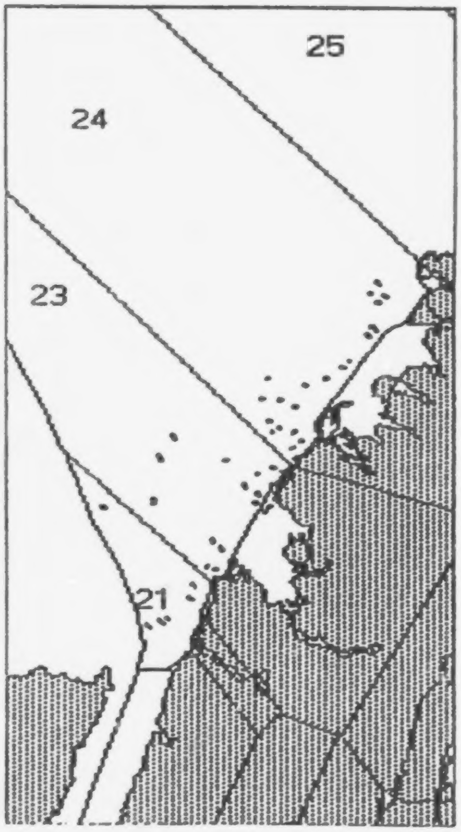
Comments: PARTLY CLOUDY

UCLUELET RADAR COUNTS

Observer: S BAIRD
Date: Day: 25 Month: 09 19: 92
Time: (24 hr clock): 800
Windspeed (knots/hr):
Amphitrite: NW 02 Estevan: SE 01

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	8
53	1
Total	9
Area 23	
Sub 55 (7 & 12 mile)	6
57 (20 mile)	3
58 (South Bank)	13
59 (Big Bank)	–
113 (Finger Bank)	2
Total	24
Area 24	
Sub 60 (La Perouse)	8
61	
62 (Portland Pt)	26
63	2
64 (Estevan Pt)	5
65	4
Total	45
Total for SWTR	78



Comments: SUNNY

UCLUELET RADAR COUNTS

Observer: S [illegible]
Date: Day 26 Month 09 19: 92
Time: (24 hr clock): 1200
Windspeed (knots/hr):
Amphitrite: NW 20 G 28 Estevan: NW 25 G 31

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	3
53	—
Total	3
Area 23	
Sub 55 (7 & 12 mile)	—
57 (20 mile)	—
58 (South Bank)	—
59 (Big bank)	1
113 ([illegible])	—
Total	1
Area 24	
Sub 60 (La Perouse)	—
61	4
62 (Portland Pt)	4
63	—
64 (Estevan Pt)	—
65	—
Total	8
Total for SWTR	12

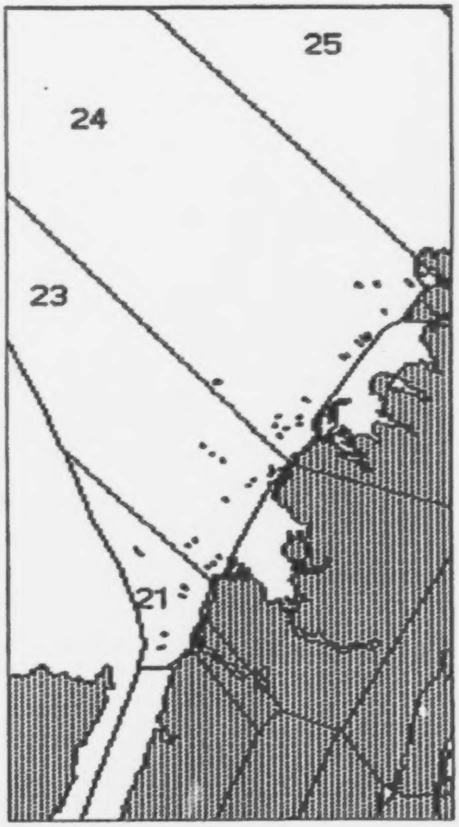
Comments: CLEAR SKIES
- Few boats - sea clutter on rader screen

UCLUELET RADAR COUNTS

Observer: S. BAIRD
Date: Day: 27 Month: 09 19: 92
Time: (24 hr clock): 800
Windspeed (knots/hr):
Amphitrite: E.11 Estevan: E 05

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	4
53	1
Total	5
Area 23	
Sub 55 (7 & 12 mile)	4
57 (20 mile)	1
58 (South Bank)	9
59 (Big Bank)	—
113 (Finger Bank)	—
Total	14
Area 24	
Sub 60 (La Perouse)	4
61	1
62 (Portland Pt)	19
63	–
64 (Estevan Pt)	4
65	2
Total	30
Total for SWTR	49



Comments: PARTLY CLOUDY - Sea clutter on radar screen.

UCLUELET RADAR COUNTS

Observer: S. BAIRD
Date: Day: 28 Month: 09 19: 92
Time: (24 hr clock): 800
Windspeed (knots/hr):
Amphitrite: SE 12 Estevan: SE.17 G.29

Estimated Number of Boats:

Area 21

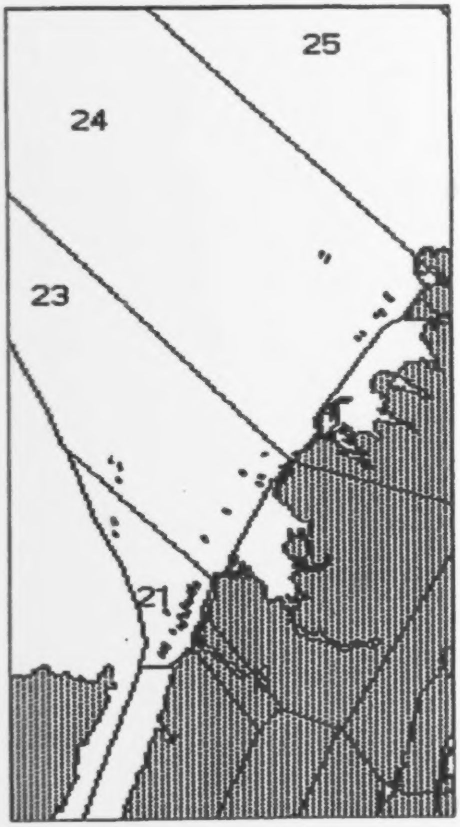
Sub 52 (Swiftsure)	53
53	7
Total	60

Area 23

Sub 55 (7 & 12 mile)	3
57 (20 mile)	3
58 (South Bank)	6
59 (Big Bank)	–
113 (Finger Bank)	4
Total	16

Area 24

Sub 60 (La Perouse)	2
61	2
62 (Portland Pt)	7
63	1
64 (Estevan Pt)	1
65	–
Total	13



Total for SWTR 89

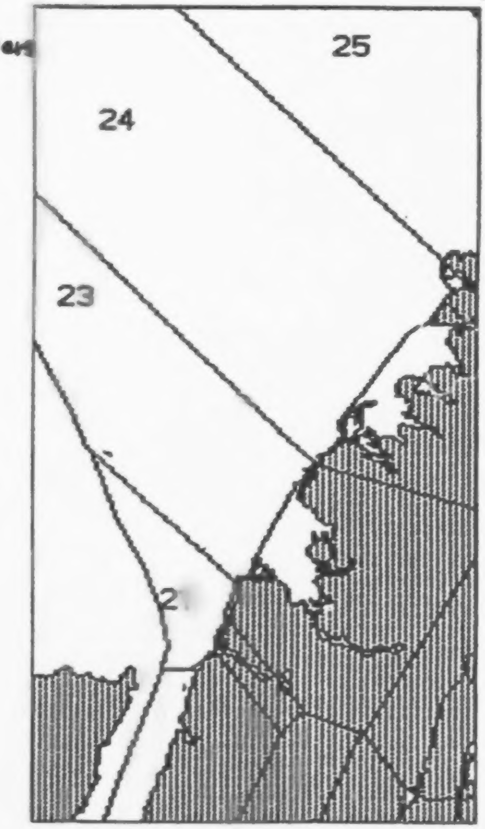
Comments: CLOUDY Large number of boats in the 53 Area.

UCLUELET RADAR COUNTS

Observer: SHIRLEY BAIRD
Date: Day: 29 Month: 09 19: 92
Time: (24 hr clock): 730
Windspeed (knots/hr):
Amphitrite: SE 12 Estevan: SE. 12 G 23

Estimated Number of Boats:

Area 21	
Sub 52 (Swiftsure)	300 Gillneters
53	2
Total	302
Area 23	
Sub 55 (7 & 12 mile)	8
57 (20 mile)	1
58 (South Bank)	9
59 (Big Bank)	—
113 (Finger Bank)	1
Total	19
Area 24	
Sub 60 (La Perouse)	3
61	—
62 (Portland Pt)	5
63	4
64 (Estevan Pt)	2
65	—
Total	14
Total for SWTR	335



Comments: SUNNY - Atmospheric conditions make it ~~Continues to be Sea Clutter on screen - boats~~ difficult to see. Large number of Gillnet boats in area 52.

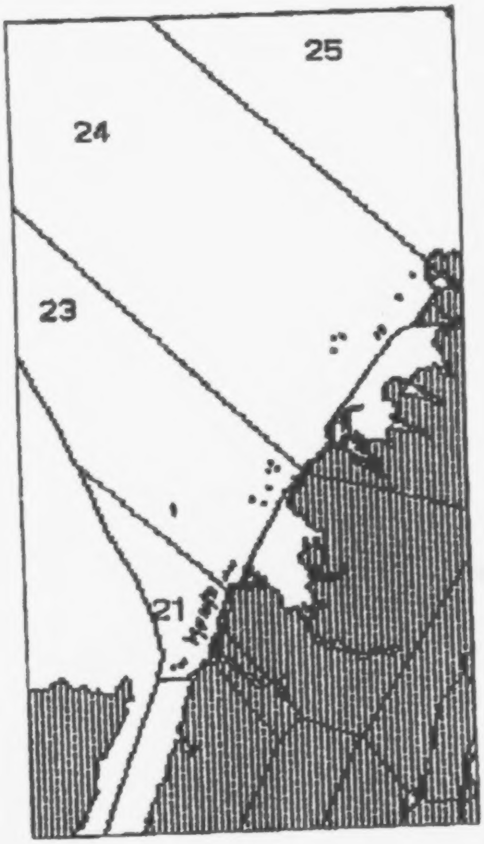
01

RAD3009 (1)

UCLUELET RADAR COUNTS

Observer: S. BAIRD
Date: Day: 30 **Month:** 09 **19:** 92
Time: (24 hr clock): 800
Windspeed (knots/hr):
Amphitrite: ______ **Estevan:** ______

Estimated Number of Boats:



Area 21

Sub 52 (Swiftsure)	Large no. of boats GN
53	–
Total	0

Area 23

Sub 55 (7 & 12 mile)	10
57 (20 mile)	1
58 (South Bank)	3
59 (Big Bank)	–
113 (Finger Bank)	2
Total	16

Area 24

Sub 60 (La Perouse)	5
61	–
62 (Portland Pt)	4
63	–
64 (Estevan Pt)	2
65	2
Total	13

Total for SWTR 29

Comments: CLOUDY - Many boats in area 52- difficult to count.

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Considerations for Optimal Siting of Receiving Arrays off Canada's West Coast for ATOC (Acoustic Thermometry of Ocean Climate)

(Volume 2 - Addendum)

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Roberto G. Racca
Ian Schumacher
Donald J. Henderson

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Addendum to
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